

## RÉSUMÉ

**GARY SCOTT COLLINS**

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**PERSONAL**

US Native Citizen, two children. Languages: English (native), French, and rudimentary German, Dutch and Chinese

**PERMANENT POSITION**

2002- PROFESSOR OF PHYSICS, and FACULTY MEMBER, MATERIALS SCIENCE AND ENGINEERING PROGRAM  
Washington State University, Pullman, WA.

Research in solid-state physics using hyperfine interaction methods, with applications to defects, lattice locations of impurities, and diffusion in compounds. Active in instruction at all levels. Previously active in university faculty governance. In Spring 2012 I ran for Chair of the University Faculty Senate, intending to broaden faculty participation in the Senate and preserve prerogatives of the faculty, but lost by a narrow vote.

**EDUCATION**

1976 DOCTOR OF PHILOSOPHY, Physics, Rutgers University, 1976.  
Dissertation: "Temperature Dependence of the Nuclear Quadrupole Interaction in Tin Metal."  
PhD Committee: Noémie Benczer-Koller (chair), Georges Temmer, Paul Leath, and Bruno Lüthi.

1966 BACHELOR OF ARTS, Physics, Rutgers College, New Brunswick, NJ, 1966.

**CAREER SYNOPSIS**

- \$4.7M in NSF research grant awards. Principal Investigator of ten grants from the National Science Foundation for \$3.55M to study metals and intermetallic compounds, including nine single-investigator awards at WSU totaling \$3.29M. Sole Co-PI of additional NSF awards for \$0.91M. Associate Investigator of an additional NSF grant for \$0.45M. A fund to support Collins group research was established in 2006 by former PhD student Praveen Sinha.
- Research advisor to 4 postdoctoral associates, and 11 PhD, 33 MS, 27 undergraduate, and 3 high-school students.
- 106 refereed publications, one edited volume, and 200+ personal presentations at conferences and in seminars. Referee and reviewer for 400+ manuscripts and research proposals. Named "*APS Outstanding Referee*" in 2011.

**ORCID**

<https://orcid.org/0000-0002-7334-9831>

## OTHER EXPERIENCE

- 2015 VISITING SCIENTIST, Institute for Materialphysics, Westfälische Wilhelm Universität (WWU), Münster (4 mos).
- 1996 VISITING SCIENTIST, Nuclear Solid-State Physics Group, University of Konstanz, Germany (6 months).
- 1995-96 VISITING SCIENTIST, Nuclear Solid-State Physics Group, University of Groningen, The Netherlands (6 months).
- 1985-02 ASSOCIATE PROFESSOR OF PHYSICS, Washington State University, Pullman, WA.
- 1979-85 RESEARCH ASSISTANT PROFESSOR, Physics, Clark University, Worcester, MA.
- 1977-79 POSTDOCTORAL RESEARCH ASSOCIATE & INSTRUCTOR, Physics, Clark University, with Christoph Hohenemser.
- 1976-77 INSTRUCTOR (COADJUTANT), Physics, Rutgers University, New Brunswick, NJ.
- 1968-76 GRADUATE ASSISTANT AND RESEARCH INTERN, Physics, Rutgers University, New Brunswick, NJ.
- 1966-68 PEACE CORPS, Lomé and Baguida, Togo, West Africa. Secondary school math/science teaching in French.

## RESEARCH

### PAST AND CURRENT INTERESTS

My interest has been in the local structure of crystalline solids, which I study by detecting hyperfine interactions using two “nuclear probe” methods: perturbed angular correlation of gamma rays (PAC) and Mössbauer spectroscopy. These methods elucidate a broad range of phenomena at the atomic scale.

- 1971-79 Quadrupole interactions in non-cubic metals. Studies of the nuclear quadrupole interaction and its temperature dependence. How the electric field gradient (EFG) measured at a probe nucleus depends on the probe.
- 1977-79 Hyperfine field shifts near solutes in ferromagnetic alloys caused to magnetic moment disturbances.
- 1979-85 Magnetic critical phenomena. Static and dynamic critical behavior of ferromagnets. Measurements of the order-parameter exponent  $\beta$  and dynamic spin-fluctuation exponent  $z$  in iron and nickel alloys and gadolinium.
- 1980-93 Point defects in metals. Production of vacancies and interstitials by plastic deformation. Formation of vacancy complexes with probe atoms in fcc metals either by accretion of elementary vacancies or by trapping mobile clusters. Annihilation of trapped vacancies by mobile interstitials. Trapping of hydrogen atoms in vacancies.
- 1990-02 Point defects in intermetallic compounds. Structural, equilibrium and deformation-induced point defects. Defect annealing and recovery. Measuring defect concentrations. Determining defect formation, migration and binding enthalpies. Mechanical alloying. Nanocrystalline materials. Probe atoms in grain-boundaries.
- 1999- Lattice locations of solute atoms in intermetallic compounds determined by nuclear quadrupole interactions measurements. How site preferences change with composition and temperature. Application of thermodynamic models to determine enthalpies and entropies of transfer of solute atoms between lattice sites. The terminal solubility of impurities in solids and liquids has also been studied using PAC.
- 2003- Diffusion of probe atoms in solids studied via nuclear quadrupolar relaxation. Relaxation is caused by jumps of hyperfine probes that are accompanied by changes in magnitude or orientation of the EFG. Jump frequencies are determined by fitting “damping” of PAC spectra using detailed relaxation models. We pioneered this approach in 2004 and found that jump frequencies are highly sensitive to the composition. Measurements have given insight into microscopic diffusion mechanisms. This approach is complementary to conventional measurements of the diffusivity made by sectioning penetration profiles.
- 2008- Full-potential, all-electron, electronic structure calculations of defect and impurity site energies and EFGs in intermetallic compounds have been carried out a few times using the *WIEN2k* program to inform our measurements, using a local 8-node workstation as well as a Teragrid supercomputer startup allocation.
- 2014- Solute-solute interactions in intermetallic compounds studied using PAC. An extension to intermetallics of the kind of measurements made on metals in the 1980's by Krzysztof Królak and Tim Cranshaw.
- 2016- Correlation factor in impurity diffusion. By combining results of tracer diffusion measurements at the University of Münster with results of PAC measurements of jump-frequencies here, using the same tracer element, the correlation factor in vacancy diffusion will be determined directly for the first time.
- 2017- Partition of solute atoms among sublattices. How solute atoms partition among sublattices in intermetallic compounds as functions of the composition of the alloy, the mole fraction of solute, and temperature.

## MAJOR RESEARCH GRANTS

- 1980-83 NSF grant DMR 80-02443, Solid State Physics Program, *Hyperfine Interactions Studies in Metals, with Applications to Critical Phenomena*. (\$183,353 for three years, at Clark University: Co-Principal Investigator, with Chris Hohenemser, P.I.).
- 1981-86 NSF grant DMR 81-08307, Metals Program, *Lattice Defects in Metals Studied by Hyperfine Interactions*. (\$258,468 for five years, at Clark University: Principal Investigator, with Chris Hohenemser, Co-P.I.).
- 1983-86 NSF grant DMR 83-03611, Low Temperature Physics Program, *Hyperfine Interactions Studies of Magnetic Critical Phenomena*. (\$327,660 for 3.5 years, at Clark University: Co-PI, with Chris Hohenemser, P.I.).
- 1987-90 NSF grant DMR 86-19688, Metals Program, *Point Defects in Metals Studied by Hyperfine Interactions*. (\$240,000 for 3 years, at Washington State University: Principal Investigator).
- 1990-93 NSF grant CTS 89-12430, *Synthesis and Physical Properties of Nanoclusters*. (\$450,000 for 3 years, at Washington State University: Associate Investigator, with Clayton Crowe and Howard Hamilton, P.I.s; John Hirth, Richard Hoagland and Jacob Chung, other Associate Investigators)
- 1990-93 NSF grant DMR 90-14163, Metals Program, *Atomic Structure and Defects in Metals and Alloys Studied by Hyperfine Interactions*. (\$275,000 for 3 years, at Washington State University: Principal Investigator).
- 1993-96 NSF grant DMR 93-13702, Metals Program, *Point Defects in Intermetallic Compounds*. (\$325,000 for 3 years, at Washington State University: Principal Investigator).
- 1996-99 NSF grant DMR 96-12306, Metals Program, *Defects and Diffusion in Intermetallic Compounds*. (\$356,320 for 3 years, at Washington State University: Principal Investigator).
- 2001-04 NSF grant DMR 00-91681, Metals Program, *Studies of Point Defects in Intermetallics using PAC* (\$419,556 for 3+1 years, at Washington State University: Principal Investigator).
- 2005-09 NSF grant DMR 05-04843, Metals Program, *Lattice Location of Solutes and Diffusion in Intermetallics*. (\$500,000 for 4 years, at Washington State University: Principal Investigator).
- 2009-13 NSF grant DMR 09-04096, Metals Program, *Diffusion in Rare-Earth Binary and Ternary Intermetallics Studied using PAC* (\$420,000 for 3+1 years, at Washington State University: Principal Investigator).
- 2010-13 NSF grant DMR 10-06772, Electronic/Photonic Materials, *Characterizing and modifying defects that trap excitons in yttrium aluminum garnets doped with rare-earth elements* (\$397,301 for 3 years, at Washington State University: Co-Principal Investigator, with Farida Selim, P.I.).
- 2014-17 NSF grant DMR 14-10159, Metals and Metallic Nanostructures, *Diffusion and solute-solute interactions in intermetallic compounds*, (\$360,000 for 3+1 years, at Washington State University: Principal Investigator).
- 2018-21 NSF grant DMR 18-09531, Metals and Metallic Nanostructures, *Partition of solute atoms among sublattices in intermetallic compounds*, (\$408,278, for 3 years, at Washington State University: Principal Investigator).

## HONORS AND AWARDS

- 1983 Creativity Award from the National Science Foundation for grant DMR 81-08307: G. S. Collins, Principal Investigator. Cited for “*outstanding scientific/ technical progress*.” An unsolicited two-year grant extension with 25% increase in funding. This award is somewhat comparable to a present-day NSF CAREER grant.
- 2005- Praveen Sinha Fund for Physics Research. Praveen graduated from WSU in 1995 with a PhD in physics and MS in computer science. He carried out PhD research in the Collins research group. In December 2005, he founded a fund to support Collins group research through a generous, unsolicited donation of \$35,000. In his dissertation research at WSU, he studied point defects produced by quenching or plastic deformation of intermetallic compounds. After graduating, he took a position as NIH postdoctoral research associate in radiation oncology at the University of Wisconsin. He earned a MBA degree in 2000. Since then he helped found several startup companies in areas of software products for managing medical images for hospitals (Ultravisual), personal computer software to protect against malware (Novashield), medical devices (HealthMyne), and has worked as an investment research analyst at Thompson. Professor Collins is honored by this support from a former student.

## INFORMATION ON THE WEB

RESEARCH GROUP WEB SITE:	<a href="http://defects.physics.wsu.edu/">http://defects.physics.wsu.edu/</a> (web page down; an archived version from 2015 can be seen at <a href="https://goo.gl/WS3qPi">https://goo.gl/WS3qPi</a> .)
COLLINS GROUP RESEARCH ARCHIVE:	<a href="http://research.libraries.wsu.edu/xmlui/handle/2376/4184">http://research.libraries.wsu.edu/xmlui/handle/2376/4184</a>
SHORT RESUME (20 PAGES):	<a href="#">Short Resume of Gary S. Collins</a>

## SENIOR RESEARCH ASSOCIATES

2003-04	Matthew O. Zacate, Research Assistant Professor, Physics, Washington State University.
2004-	Matthew O. Zacate, Adjunct Prof. WSU. Associate Professor, Physics, Northern Kentucky University.
2009-13	Farida Selim, Research Assistant Professor, Physics, Washington State University. Now Assistant Professor of Physics, Bowling Green University, Bowling Green, Ohio.

## VISITING SCHOLAR

2015-16	Debashis Banerjee, Scientific Officer, Bhabha Atomic Research Center (BARC), Kolkata, India, visiting three-month leave.
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## RESEARCH ADVISING

Postdoctoral associates	Period	Research topic
Luke S.-J. Peng	May 98 – Feb 99	Point defects in FeAl and NiAl; phase embryos (PAC)
Matthew O. Zacate	Mar 99 - May 03	Phase embryos, site-preferences in compounds, nuclear quadrupolar relaxation caused by diffusion (PAC)
Farida Selim	Nov 05 – May 07	Site-preferences and atom movement in compounds (PAC)
Debashis Banerjee	Nov 15 – Jan 16	Solute-solute interactions in intermetallic compounds

PhD students	Period	Dissertation topic
Carl Allard †	Jul 81-May 85	Migration and annealing of point defects in Ni (PAC)
Ataur Rahman Chowdhury †	Jul 80-May 85	Static and dynamic critical phenomena (Mössbauer)
Reinhardt B. Schuhmann †	Sep 82-May 88	Point defects in fcc metals (PAC)
Steven L. Shropshire	Dec 88-Aug 91	Studies of defects and defect interactions in metals (PAC)
Jiawen Fan	May 89-May 92	Thermal defects in quenched NiAl and CoAl (PAC)
Praveen Sinha	May 90-Jul 95	Defects in quenched and mechanically milled PdIn (PAC)
Bin Bai	May 95-Sep 97	Equilibrium defects in NiAl (PAC)
Shing-Jen (Luke) Peng	May 93-May 98	Defects in annealed and milled FeAl and FeRh (Mössbauer)
John P. Bevington	Aug 08-May 11	PAC and DFT studies of Al <sub>3</sub> Ni, Al <sub>3</sub> Ti & Al <sub>3</sub> Zr, and In <sub>3</sub> R phases
Randal Newhouse	Dec 07-Oct 12	Diffusion in ordered compounds and pseudo-binary alloys
Ryan Murray	Sep 14-May 17	Solute-solute interactions in intermetallic compounds

† Coadvisor of record; advised jointly with Prof. Chris Hohenemser, at Clark University, Worcester, MA.

MS level students	Period	Thesis or research topic
John S. Ochab †	Sep 78-May 80	Critical behavior in Rh <sub>2</sub> FeSn
Hwa-Jae Jang	Jan 87- Jun 88	Hydrogen decoration of vacancies in Pt
Steven L. Shropshire	Jan 87- Dec 88	Point defects in cold-worked metals
Jiawen Fan	Aug 88-May 89	Atomic defects in NiAl
Gregory McGhee	May 88-May 89	Defects in hcp Co; non-observation of hydrogen in Au and Cu
Khushairi Zainun	May 88-May 89	Laser surface-melted metals
Steven Parry	May 89-May 90	Cold-fusion calorimetry
Gil-Hong Kim	Jan 90- Jul 90	Defects in annealed and quenched TiAl
John Sy	May 91-Jun 92	Martensitic phase transformation in NiTi
Bruce H. Meeves	May 92- Dec 93	Formation of FeCo and Ni <sub>3</sub> Fe by mechanical alloying

Bin Bai	May 91- May 95	Grain boundary sites in metals
Mingzhong Wei	May 95 -May 98	Point defects in FeAl studied by PAC
Harmen Thys Nieuwenhuis*	Jan 98 - May 98	Vacancy motion in PdIn
Bonner C. Walsh	Aug 01- May 02	Site selection of solutes in compounds
Denys Solodovnikov	Mar 03 -Dec 03	Diffusion in several rare-earth indide compounds
Aur�lie Favrot**	Jun 03 - Sep 03	Site preference and diffusion of solutes in compounds
Egbert Rein Nieuwenhuis*	Sep 03- Jun 04	(1) Diffusion in Ga <sub>7</sub> Pd <sub>3</sub> via nuclear quadrupole relaxation (2) Polymorphic phase transformation in In <sub>2</sub> La
Jipeng Wang	Sep 03- May 04	Diffusion in LaSn <sub>3</sub>
Li Kang	Nov 03-May 04	Diffusion in CeIn <sub>3</sub>
Lai Wang	Jan 05- May 05	Analytic calculation of Wigner-Seitz volumes in compounds
John P. Bevington	Aug 05-Aug 08	Site preferences and dynamics in intermetallics (experiment)
Xiao Wang	Jan 06- May 07	Defects in II-VI semiconductors such as ZnS studied using PAC
Arriety Lowell	Jan 06- May 07	Site preferences in rare-earth aluminides having C15 structure
Xia (Sean) Jiang	Jan 07- May 08	Jump frequencies of In/Cd probe atoms in L1 <sub>2</sub> gallides
Xiangyu (Desmond) Yin	Oct 09- May 11	PAC studies gallium and eutectic gallium alloys
Qiaoming Wang	Jan 11- May 12	Site preferences and diffusion in rare-earth palladides
Mark Kohan	Summer 2013	Miedema model for site preferences of solutes in compounds
Sherry Orton	Apr 14- Jul 15	Modeling defect concentrations and diffusion in ordered alloys
Krystal Kasal	Jun 14- Jun 15	Investigations of ternary alloys using PAC
Windy Olsen	Nov 17-	Studies of solutes in intermetallics
Kyle Elsasser	Aug 18-	Studies of solutes in intermetallics
Annesh Mukhopadhyay	Nov 18-	<i>to be determined</i>
Bryant Ward	Nov 18-	<i>to be determined</i>

<sup>†</sup> Coadvisor of record; advised jointly with Prof. Chris Hohenemser, at Clark University, Worcester, MA.

\* Visiting graduate students from the University of Groningen, The Netherlands, carrying out research here in partial fulfillment of requirements for their MS degrees.

\*\* Visiting graduate student from Institute Nationale des Sciences Appliqu es (INSA), Rennes, France, carrying out research at WSU in partial fulfillment of her MS degree.

Undergraduate Student	Period	Thesis or research topic
Samuel W. Porter <sup>†</sup>	Sep 79-May 80	Splat-quenched, amorphous Fe <sub>80</sub> B <sub>20</sub> (M�ssbauer)
Gil P. Stern <sup>†</sup>	Sep 80-May 81	Point defects in deformed fcc metals
Reinhardt B. Schuhmann <sup>†</sup>	Sep 81-May 82	Point defects in Ni in annealing stage III
Andrew Vaught	Sep 88-May 89	Embedded atom method calculations
Phillip Himmer	May 88-Aug 89	Point defects in oxides & palladium
Stacy Irwin	May 89-Dec 89	Point defects in rhodium
Kirk Burris	May 90-May 91	Defects in alloys; nanoclusters
Andrew Janssen	Sep 98-Dec 98	Point defects in FePd (M�ssbauer)
Matthew Petersen (UI student)	May 99-Aug 99	Point defects in quenched and annealed FePd (M�ssbauer)
Bonner C. Walsh	May 00-Dec 00	Site preferences of solutes in compounds
Slade Jokela	May 01-Aug 01	Solute in intermetallic compounds
Phillip Peterman	Jan 05- May 05	Numerical calculation of Wigner-Seitz cell volumes
Morgan Emerson	Feb 06 - May 07	Wigner Seitz cells: geometry and contact areas
Stephanie Lage *	May 06- May 07	Dynamics of tracer atoms in intermetallic phases Al <sub>11</sub> R <sub>3</sub>
Ben Norman *	Jan 07- May 08	Solute atoms in "mirror" phases (WSU honors thesis, Oct 07)
Ashley Dorwart <sup>+</sup>	May 07 - Aug 07	Lattice locations of indium in Gd-Al alloys
Megan Lockwood <sup>+</sup>	May 08 - Aug 08	Jump frequencies of cadmium tracer atoms in tin intermetallics
Samantha Cawthorne <sup>+</sup>	May 09 - Aug 09	Diffusion in Al <sub>4</sub> Sr and Ga <sub>4</sub> Sr
Kenneth Dorrance *	Jan 10 - Dec 11	Wigner-Seitz cells: calculating volumes and contact areas
Justine Minish <sup>++</sup>	Jun 10 - Aug 10	Diffusion in pseudo-binary La(In,Sn) <sub>3</sub> alloys
Lee Aspitarte <sup>++</sup>	May 10 - Aug 11	Polymorphic and peritectic phase transformations in In <sub>3</sub> Zr
Jesse Miller	Feb 11 - Apr 12	Temperature dependence of the hyperfine magnetic field in Ni
Benjamin McDonald *	Jan 12 - May 13	Wigner-Seitz cells: predicting site preferences of solute atoms
Ryan Harrison	Summer 2013	Miedema model for site preferences of solutes in compounds
Andrew Bleasdale *	Jan 14 - May 17	Miedema model for site preferences of solutes in compounds

Elyse Waham	Sep 15 – May 16	A qualitative look at the thermodynamics of ternary phases
Gabrielle Schuler	Sep 17 – Dec 17	Solid-solution strengthening of alloys

† At Clark University, Worcester, MA.

\* Recipients of Undergraduate Research Grants, College of Sciences, or College of Arts and Sciences, WSU.

+ Participants in Research Experience for Undergraduates (REU) Summer School “Extreme Matter” at WSU, supported in part by the NSF and AFOSR: Ashley is from Nebraska Wesleyan U; Megan is from New Mexico State U., married name now Harberts; Samantha is from Clemson U.,

++ Supported by REU supplements to NSF grant DMR 09-04096; Justine, from Alma College, Alma, Michigan, was supported in summer 2010; Lee, from WSU, was supported in summer 2011.

High School Students	Period	Research topic
Kyle Slinker, Pullman HS *	Jun 05-Aug 06	Analytic calculation of properties of Wigner-Seitz cells
Justin Ahn, Pullman HS *	Jun 07-May 08	Diffusion in intermetallic compounds including In <sub>3</sub> Nd
Prastuti Singh, Pullman HS *†	Jun 09-May 10	Diffusion in CoGa <sub>3</sub> phases ( <i>Intel Science Talent Search</i> winner)

\* Culminating senior projects.

† Semifinalist in *Intel Science Talent Search* 2010 based on her research, with \$1000 prizes for herself and Pullman HS.

## PUBLICATIONS

### A. EDITED VOLUME

Hyperfine Interactions in Nanocrystalline Materials, guest editor Gary S. Collins, *Hyperfine Interactions* **130** (1-4) (Kluwer, Dordrecht, 2000), 300 pages.

### B. REFEREED JOURNAL ARTICLES AND CONFERENCE PROCEEDINGS

(Many papers were available at a website that is currently down; <http://defects.physics.wsu.edu>.)

1. *Systematics of Hyperfine Interactions at Sn and Other 5s-p Diamagnetic Impurities in Ferromagnetic MnSb*, *Phys. Rev. B* **15**, 1235-1238 (1977); G. S. Collins, N. Benczer-Koller and M. Pasternak.
2. *Nuclear Quadrupole Interaction in Tin Metal*, *Phys. Rev. B* **17**, 2085-2097 (1978); G. S. Collins and N. Benczer-Koller.
3. *Effects of Probe Valence on the Conduction Electron Electric-Field Gradient in Noncubic Metals*, *Hyperfine Interactions* **4**, 523-527 (1978); G. S. Collins.
4. *Applications of the Mössbauer Effect to the Characterization of an Amorphous Tin-Oxide System*, *Phys. Rev. B* **19**, 1369-1373 (1979); G. S. Collins, T. Kachnowski, N. Benczer-Koller and M. Pasternak.
5. *Hyperfine Field Distributions in Nickel Alloys Measured by Time Differential Perturbed Angular Correlations*, *Phys. Lett.* **78A**, 201-204 (1980); G. S. Collins, L. Chow, T. Eschrich and C. Hohenemser.
6. *Hyperfine Field Distributions at <sup>111</sup>Cd Probes in Nickel Alloys: I. Nontransition Metals Solutes Cu and Si*, *Hyperfine Interactions* **9**, 465-470 (1981); G. S. Collins.
7. *Hyperfine Field Distributions at <sup>111</sup>Cd Probes in Nickel Alloys: II. Transition Metal Solutes Fe, Co, Mn and Rh*, *Hyperfine Interactions* **9**, 471-476 (1981); G. S. Collins.
8. *Critical Behavior of Quenched, Randomly Disordered Ni and Fe Alloys*, *Hyperfine Interactions* **10**, 893-899 (1981); A. R. Chowdhury, C. Allard, R. M. Suter, G. S. Collins, C. Hohenemser and M. A. Kobeissi.
9. *Vacancy Trapping in Plastically Deformed Metals Studied by Hyperfine Interactions*, *Phys. Lett.* **84A**, 289-293 (1981); G. S. Collins, G. P. Stern and C. Hohenemser.
10. *Comparison of Dynamical Critical Behavior in Isotropic Ferromagnets*, *J. Appl. Phys.* **53**, 7942-7944 (1982); C. Hohenemser, L. Chow, A. R. Chowdhury and G. S. Collins.
11. *Mössbauer Measurements of Static Critical Behavior in Disordered FeAl Alloys*, *Phys. Rev. B* **26**, 4997-5008 (1982); G. S. Collins, A. R. Chowdhury, and C. Hohenemser.
12. *Deuterium Desorption and Host Interstitial Clustering in d-irradiated Ni*, in Electronic Structure and Properties of Hydrogen in Metals, ed. P. Jena and C. B. Satterthwaite, (Plenum: N.Y., 1983) p. 589-94; C. Allard, G. S. Collins and C. Hohenemser.
13. *Comment on the Role of Spin Nonconserving Forces in the Critical Dynamics of Fe and Ni*, *Phys. Rev. Lett.* **50**, 1877 (1983); C. Hohenemser, R. M. Suter, L. Chow and G. S. Collins.
14. *Defect Recovery and Trapping in Plastically Deformed Au Studied by Perturbed Angular Correlations of <sup>111</sup>In*, *Phys. Rev. B* **28**, 2940-2946 (1983); G. S. Collins, C. Allard, R. B. Schuhmann and C. Hohenemser. Erratum: *Phys. Rev. B* **31**, 2528 (1985).
15. *Comparison of Defect Recovery in Proton Irradiated, Deformed and Ion Implanted Ni as Observed by PAC of <sup>111</sup>In*, *Hyperfine Interactions* **15/16**, 387-390 (1983); C. Allard, G. S. Collins and C. Hohenemser.
16. *Trivacancy Recovery and Formation of a Cubic Symmetry Defect Trap on <sup>111</sup>In Impurities in Ni*, *Hyperfine Interactions* **15/16**, 391-394 (1983); G. S. Collins and R. B. Schuhmann.
17. *Anomalous Temperature Dependence of the Quadrupole Coupling Frequency of a Lattice Defect Trapped to <sup>111</sup>In in Pt*, *Hyperfine Interactions* **15/16**, 395-399 (1983); G. S. Collins and R. B. Schuhmann.
18. *Nuclear Spin Relaxation of <sup>161</sup>Dy in Gd above the Curie Temperature Observed with the Mössbauer Effect*, *Hyperfine Interactions* **15/16**, 617-620 (1983); A. Chowdhury, G. Collins and C. Hohenemser.

19. *Anomalous Critical Slowing Down of Spin Fluctuations in Gd Observed with  $^{161}\text{Dy}$  Mössbauer Effect*, Phys. Rev. B30, 6277-6284 (1984); A. R. Chowdhury, G. S. Collins and C. Hohenemser.
20. *Vacancy Migration and Accretion in Ni Observed by Perturbed Gamma-Gamma Angular Correlations*, Phys. Rev. B32, 4839-4848 (1985); C. Allard, G. S. Collins and C. Hohenemser.
21. *An Fe Mössbauer Effect Study of Metastable  $\text{Al}_{86}\text{Fe}_{14}$  Prepared by Rapid Solidification*, Hyperfine Interactions 26, 963-966 (1986); R. A. Dunlap, K. Dini, G. Stroink, G. S. Collins and S. Jha.
22. *The Effect of Random Anisotropy on Critical Behavior: Search for Hysteresis and Rounding in FeV using the Mössbauer Effect*, Hyperfine Interactions 28, 673-676 (1986); X. S. Chang, G. S. Collins and C. Hohenemser.
23. *Anomalous Critical Spin Dynamics in Gd: A Revision*, Phys. Rev. B33, 5070-5072 (1986); A. R. Chowdhury, G. S. Collins and C. Hohenemser.
24. *Static Universality Class Implied by the Critical Exponents in Gd*, Phys. Rev. B33, 6231-6234 (1986); A. R. Chowdhury, G. S. Collins and C. Hohenemser.
25. *Observation of Isotropic Critical Spin Fluctuations in Gd*, Phys. Rev. B33, 4747-4751 (1986); G. S. Collins, A. R. Chowdhury and C. Hohenemser.
26. *Hydrogen and Deuterium Decoration of a Vacancy Complex in Ni*, Phys. Rev. B34, 502-505 (1986); G. S. Collins and R. B. Schuhmann.
27. *Point Defects in Deformed Metals Studied by Perturbed Gamma-Gamma Angular Correlations*, Materials Science Forum 15-18, 783-788 (1987); G. S. Collins.
28. *Hydrogen-Vacancy Interactions in Ni Studied by Perturbed Angular Correlations*, Materials Science Forum 15-18, 681-684 (1987); G. S. Collins and R. B. Schuhmann.
29. *Defects in Laser Surface-Melted Metals Studied by PAC*, in Characterization of Defects in Materials, ed. R. W. Siegel, J. R. Weertman and R. Sinclair, Mat. Res. Soc. Symp. Proc. 82, 53-58; (1987) G. S. Collins, C. Allard, C. Hohenemser and C. W. Draper.
30. *Perturbed Angular Correlations Studies of Alloys*, in Electronic Structure and Lattice Defects in Alloys, eds. R. W. Siegel and F. E. Fujita (Trans Tech Publications, 1989), p. 139-149; G. S. Collins.
31. *Hydrogen Decoration of Vacancy Defects in Platinum*, in Nuclear Physics Applications on Materials Science, ed. E. Recknagel and J. C. Soares, NATO ASI Series E: Applied Science (Kluwer, Dordrecht 1988), vol. 144, p. 415-416; G. S. Collins, H.-J. Jang and S. Shropshire.
32. *Diffusion and Trapping of Hydrogen in Vacancies in Platinum Studied by PAC*, Defect and Diffusion Forum 66-69, 335-340 (1989); G. S. Collins, S. L. Shropshire and H.-J. Jang.
33. *Production and Migration of Interstitials in Deformed Metals*, Hyperfine Interactions 60, 667-670 (1990); Steven L. Shropshire and G. S. Collins.
34. *Cage Motion of a Probe Atom in a Vacancy Complex in Pt*, Hyperfine Interactions 60, 651-654 (1990); G. S. Collins, S. L. Shropshire and H.-J. Jang.
35. *Point Defects in NiAl Near the Equiatomic Composition*, Hyperfine Int. 60, 655-658 (1990); J. Fan and G. S. Collins.
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39. *Perturbed gamma-gamma Angular Correlations: A Spectroscopy for Point Defects in Metals and Alloys*, Hyperfine Interactions 62, 1-34 (1990); G. S. Collins, S. L. Shropshire and J. Fan.
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41. *Application of PAC to study equilibrium point defects in intermetallic compounds*, Hyperfine Interactions 80, 1257-



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42. *Equilibrium point defects in TiAl studied by PAC*, *Hyperfine Interactions* 79, 745-8 (1993); Jiawen Fan and Gary S. Collins.
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  45. *Grain boundary sites in fcc metals studied by PAC*, *Hyperfine Interact.* 79, 761-764 (1993); Bin Bai and Gary S. Collins.
  46. *The martensitic phase transition in NiTi*, *Hyperfine Interactions* 80, 995-998 (1993); John C. Sy and Gary S. Collins.
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  50. *Mössbauer and PAC studies of nanocrystalline Fe*, *Hyperfine Interactions* 92, 949-953 (1994); P. Sinha and G.S. Collins.
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  55. *Atomic defects and disorder in mechanically-milled intermetallic compounds*, *Materials Science Forum* 225-227, 275-80 (1996); Gary S. Collins and Praveen Sinha.
  56. *Point defects in B2 intermetallic compounds*, *Hyperfine Interactions (C)*1, 380-384 (1996); Gary S. Collins, Praveen Sinha and Mingzhong Wei.
  57. *Point defects in FeAl*, *Il Nuovo Cimento* 18D, 329-336 (1996); Gary S. Collins and Luke S.J. Peng.
  58. *Disordering of FeAl by Mechanical Milling*, *Materials Science Forum* 235-238, 535-541 (1997); Luke S.J. Peng and Gary S. Collins.
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66. *Search for nucleation of phase embryos in binary alloys by impurity atoms*, by Gary S. Collins, Luke S.-J. Peng and Matthew O. Zacate, Z. Naturforschung 55a, 129-133 (2000).
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68. Vacancy Jumps in PdIn: Reconciling Nuclear Relaxation and Diffusion Measurements, Gary S. Collins and Harmen Thys Nieuwenhuis, Defect and Diffusion Forum 194-199, 375-83 (2001).
69. Vacancy-vacancy interactions in NiAl, Matthew O. Zacate and Gary S. Collins, Defect and Diffusion Forum 194-199, 383-88 (2001).
70. Nucleation of a second phase by individual impurity atoms, Matthew O. Zacate, Gary S. Collins and Luke S.-J. Peng, Materials Science and Engineering A 329-331, 920-924 (2001).
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72. Site preferences of hyperfine impurities in Ni<sub>2</sub>Al<sub>3</sub> phases, Matthew O. Zacate and Gary S. Collins, Hyperfine Interactions 136/137, 647-652 (2001).
73. Segregation of solutes in two-phase mixtures, Matthew O. Zacate, Bonner C. Walsh, Luke S.-J. Peng and Gary S. Collins, Hyperfine Interactions 136/137, 653-658 (2001).
74. Stochastic model of PAC nuclear relaxation caused by defects hopping on a simple cubic lattice, Taylor D. Grow, Stephanie Plamondon, William E. Evenson and Gary S. Collins, Hyperfine Interactions 136/137, 627-632 (2001).
75. Influences of lattice sinks and defect interactions on solutes in compounds, Gary S. Collins and Matthew O. Zacate, Mat. Res. Soc. Symp. Proc., vol. 719, pages F8.19.1-F8.19.6 (2002).
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83. Jump frequency of Cd tracer atoms in β-Mn, Matthew O. Zacate and Gary S. Collins, Defect and Diffusion Forum 237-240, 396-401 (2005).
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101. [Determination of the crystal structures of  \$In70-Ni30\$  and  \$In70-Pd30\$  using perturbed angular correlation](#), Lee Aspirtarte, Egbert R. Nieuwenhuis and Gary S. Collins, *Hyperfine Interactions* **221**, 73-78 (2013). <http://dx.doi.org/10.1007/s10751-012-0678-4>. <http://arxiv.org/abs/1210.3076>.
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104. *Segregation of solute atoms to interphase boundaries in GdNi<sub>2</sub>*, Ryan Murray, Debashis Banerjee, Gary S. Collins and Matthew O. Zacate. *Hyperfine Interact* (2017) 238:17. (11 pages). Available for view at <http://rdcu.be/ouez>. <http://dx.doi.org/10.1007/s10751-016-1394-2>.
105. *Site occupation of indium and jump frequencies of cadmium in FeGa<sub>3</sub>*, Randal Newhouse, Gary S. Collins and Matthew O. Zacate. *Hyperfine Interact.* (2017) 238:137. (12 pages). Available for view at <http://rdcu.be/o7u2>. <http://dx.doi.org/10.1007/s10751-016-1341-2>.
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### C. UNREFEREED AND OTHER PUBLICATIONS

1. Three-Year Progress Report 1976-79, Hyperfine Interactions Group, Clark University, October 1979, 138 pages; eds. G. S. Collins and C. Hohenemser.
2. Book review: Physics for Scientists and Engineers, Sheldon H. Radin and Robert T. Folk; Prentice-Hall, Englewood Cliffs, NJ 1982; *Amer. Jour. Phys.* 53, 382-3 (1985).
3. Book review: Rules of Thumb for Physical Scientists, D. J. Fisher, Trans Tech Publications, Switzerland; *Amer. Jour. Phys.* 57, 669 (1989).
4. *Deuteron Tunneling at Electron-Volt Energies*, G. S. Collins, J. W. Norbury and J. S. Walker, *Journal of Fusion Energy* 9, 409-11 (1990).
5. Preface, Hyperfine Interactions of Nanocrystalline Materials, ed. G.S. Collins, *Hyperfine Int.* 130, 1-3 (2000).
6. *Thermodynamic model of solute site preferences in ordered alloys*. Gary S. Collins and Matthew O. Zacate (submitted *Phys Rev B*, 2001; posted to arxiv, 2015; 44 pages, 7 tables, 9 figures). <http://arxiv.org/abs/1503.08068>

### D. RESEARCH ARCHIVE

WSU Research Exchange, <https://research.libraries.wsu.edu/xmlui/handle/2376/4184>

Contains technical reports (dissertations and theses) under National Science Foundation grants 09-04096 and 14-10159. Also a large, public, data archive containing most PAC spectra collected over more than three decades of research at WSU under nine single-investigator NSF grants.

### E. UNDER PREPARATION

1. *Solubility and partition of In solute among sublattices in intermetallic GdAl<sub>2</sub>*, Ryan Murray and Gary S. Collins (to be submitted to *Physical Review B*).
2. *Dependence of solute transfer between sublattices of eight Al<sub>2</sub>R (R= rare earth) phases as a function of composition and temperature*, Windy Olsen and Arriety Lowell, to be submitted.

## PROFESSIONAL SERVICE

#### Editorial boards and editorships:

Associate Editor, Hyperfine Interactions (Springer, 1998-now )

Editorial Advisory Board Member, Materials Science Foundations (Trans Tech, 1997-now)

Member, Editorial Board, Solid-State Phenomena (Trans Tech, ~2000-now)

Guest Editor, Hyperfine Interactions in Nanocrystalline Materials, *Hyperfine Interactions* 130 (Kluwer 2000)

Journal article referee: (321 reports, 1982-2018)

Applied Physics Letters  
 Chemical Physics (Elsevier)  
 Chemical Physics Letters (Elsevier)  
 Computer Physics Communications  
 Europhysics Letters  
 Hyperfine Interactions (*many*)  
 IEEE Transactions on Magnetics  
 Inorganic Chemistry  
 Intermetallics  
 International Journal of Hydrogen Energy  
 Journal of Alloys and Compounds  
 Journal of Applied Physics  
 Journal of Chemical Physics  
 Journal of Fusion Technology  
 Journal of Magnetism and Magnetic Materials (*many*)  
 Journal of Materials Engineering and Performance  
 Journal of Materials Research  
 Journal of Materials Science  
 Journal of Nuclear Materials  
 Journal of Physical Chemistry  
 Journal of Physical Chemistry Letters  
 Journal of Physics: Condensed Matter (*many*)  
 Journal of Physics D: Applied Physics  
 Journal of the Physics and Chemistry of Solids  
 Materials Research Society Symposium Proceedings  
 Materials Science and Engineering A  
 Metallurgical and Materials Transactions A  
 Metallurgical Transactions A  
 Modeling and Simulation in Materials Science and Engineering  
 Nanotechnology  
 New Journal of Physics  
 Nuclear Instruments and Methods B: Beam Interactions with Materials and Atoms  
 Philosophical Magazine  
 Physical Review B (*very many*)  
 Physical Review Letters (*very many*)  
 Physics Letters A  
 Scripta Metallurgica et Materialia  
 Spectroscopy  
 Thin Solid Films  
*Also ten or so additional submissions refereed at national and international conferences.*

Named “*Outstanding Referee of the American Physical Society*”  
January 2011



Proposal reviewer: (88 reviews, 1981-2018)

Czech Science Foundation  
 Department of Energy (DOE) Materials Science Division (regular and SBIR)  
 DOE Solid State Physics and Materials  
 FOM Materials Science (The Netherlands)  
 FWO Science Research Foundation (Flanders)  
 Idaho Board of Education Special Research Grant  
 International Science Foundation (George Soros)  
 Israel Science Foundation  
 National Research Foundation (South Africa)  
 National Science Foundation (NSF) Ceramic and Electronic Materials  
 NSF Chemistry (Materials Synthesis and Processing)  
 NSF CAREER Program  
 NSF Ceramics  
 NSF Condensed Matter Physics  
 NSF Electronic Materials  
 NSF International Programs  
 NSF Low Temperature Physics

NSF Major Research Instrumentation  
 NSF Metals, and Metals and Metallic Nanostructures  
 NSF Research Experience for Undergraduates  
 NSF Solid State Physics  
 NSF Two and Four Year College Instrumentation  
 Natural Sciences and Engineering Research Council (NSERC), Canada  
 Natural Sciences and Engineering Research Council (NSERC), Canada, Discovery Grants  
 Petroleum Research Fund  
 Research Corporation  
 Rustaveli National Science Foundation, Georgia (former SSR)  
 Severo Ochoa, Grant Program for Research Centers, Spanish National Agency for Scientific Research (ANEP)  
 Tata Institute for Fundamental Research, Mumbai  
 US Civilian Research and Development Foundation (Cooperative grants between Eurasian and US researchers)  
 US Civilian Research and Development Foundation and Russian Foundation for Basic Research  
 (2008 Cooperative Grant Program--RFBR Multidisciplinary Climate Change Competition)

Book proposal reviewer: CRC Press, Taylor and Francis Publishers, Dec. 2004; Elsevier, Feb. 2015.

Proposal review panelist: National Science Foundation, Condensed Matter Physics, CAREER grants, Jan. 1997.  
 National Science Foundation, DMR, MMN (Metals), remote review panel, Feb. 2016.

Program review panelist: Department of Energy, Materials Science Program, Bethesda, May 1993.

Conference organization:

Member, International Advisory Committee, *10<sup>th</sup> Int. Conf. on Hyperfine Interactions*, Leuven, Aug. 1995  
 Member, International Advisory Committee, *11<sup>th</sup> Int. Conf. on Hyperfine Interactions*, Johannesburg, Aug 1998  
 Member, International Committee on Nuclear Quadrupole Interactions, 1999-2004 and 2007-2010; an executive committee overseeing periodic International Symposia on Nuclear Quadrupole Interactions (NQI series).  
 Member, Organizing Committee, *12<sup>th</sup> Int. Conf. on Hyperfine Interactions*, Park City, Aug 2001  
 Member, International Advisory Committee, *12<sup>th</sup> Int. Conf. on Hyperfine Interactions*, Park City, Aug 2001  
 Principal Organizer and Chair, *17<sup>th</sup> International Symposium on Nuclear Quadrupole Interactions*, Seattle, September 2003 (meeting postponed and subsequently combined with Hyperfine Interactions conference in Bonn in August 2004 under a different chairman)  
 Co-chair, Local Organizing Committee, *Northwest Section Meeting*, American Physical Society, May 20-21, 2004, University of Idaho and Washington State University, Pullman, WA and Moscow, ID  
 Member, International Advisory Committee, *13<sup>th</sup> Int. Conf. on Hyperfine Interactions*, Bonn, August 23-27, 2004  
 Member, International Advisory Committee, *International Workshop on 35<sup>th</sup> Anniversary of Hyperfine Interactions at La Plata*, Buenos Aires, Nov 2005.  
 Member, Program Committee to select plenary, invited condensed matter physics speakers for the *Northwest Section Meeting*, American Physical Society, Victoria, BC, May 2005.  
 Member, International Advisory Committee, *14<sup>th</sup> Int. Conf. on Hyperfine Interactions* and *18<sup>th</sup> Internat. Symposium on Nuclear Quadrupole Interactions (HFI/NQI 2007)*, Iguassu Falls, Brazil, August 6-10, 2007.  
 Member, International Advisory Committee, *15<sup>th</sup> Int. Conf. on Hyperfine Interactions and International Symposium on Nuclear Quadrupole Interactions (HFI/NQI 2010)*, Geneva, September 2010.  
 Member, Advisory Committee, *International Workshop on Grain Boundary Diffusion, Stresses and Segregation (DSS-2010)*, Moscow, May 2010.  
 Member, International Advisory Committee, *16<sup>th</sup> Int. Conf. on Hyperfine Interactions and International Symposium on Nuclear Quadrupole Interactions (HFI/NQI 2012)*, Beijing, September 2012.  
 Member, International Advisory Committee, *5<sup>th</sup> Joint Meeting of the Int. Conf. on Hyperfine Interactions and International Symposium on Nuclear Quadrupole Interactions (HFI/NQI 2014)*, Canberra, Sept 2014.  
 Member, International Advisory Committee, *International Conference on Hyperfine Interactions and their Application (Hyperfine2016)*, Leuven, July 2016.

Workshops attended:

*15<sup>th</sup> WIEN2k FLAPW-lo Calculation Workshop*, Vienna, March 25-29, 2008; organized by Prof. Dr. Karlheinz Schwarz and Peter Blaha, Technical University of Vienna. <http://www.wien2k.at/events/ws2008/>  
*ISOLDE Users' Workshop*, European Center for Nuclear Research (CERN), November 18-19, 2008, Geneva. <http://indico.cern.ch/conferenceDisplay.py?confId=36293>

Affiliations at Washington State University:

Materials Science and Engineering Program (1987-2015; originally *Chemical Physics Program*)  
 Center for Materials Research (1989- now)  
 AAUP local chapter at WSU, Member-at-Large, Executive Committee, <http://www.wsu-aaup.org> (since fall 2009)

Professional society memberships:

American Physical Society (APS), active  
 American Association of University Professors (AAUP)  
 AAUP-WSU Chapter, Member-at-Large, Executive Committee (AAUP-WSU)  
 Materials Research Society (MRS) and The Minerals, Metals & Materials Society (TMS) (past)

Professional society committee service:

Chemistry and Physics of Materials Committee, TMS, member, elected 1995-98.

Consulting

1991-93 Consultant: *Idaho National Engineering Laboratory*.  
 1993 Consultant: *Oak Ridge National Laboratory*.  
 2013 Consultant: *CEBAF accelerator, Jefferson Laboratory, Newport News, VA*

Evaluations for Promotion, Tenure, and Awards

1994 For promotion to associate professor of physics and tenure, Hussein Hamdeh, Physics, Wichita State Univ.  
 1998 For promotion to full professor of physics, Hussein Hamdeh, Physics, Wichita State University.  
 2000 For Killam Faculty of Science Distinguished Professorship, Richard A. Dunlap, Dalhousie University.  
 2002 For promotion to full professor of physics, Bengt Lindgren, Physics, Uppsala University.  
 2003 For promotion to associate professor and tenure, Ralf Busch, Materials, Oregon State University.  
 2005 For promotion to full professor of materials science, Ralf Busch, Materials, Oregon State University.  
 2007 For Distinguished Researcher Award, Lee Chow, Physics, University of Central Florida.  
 2007 For promotion to senior lecturer, Ilan Yaar, Ben-Gurion University of the Negev.  
 2007 For promotion to full professor of physics, Herbert Jaeger, Miami University.  
 2008 For promotion to adjunct associate professor, Ilan Yaar, Ben-Gurion University of the Negev.  
 2009 For promotion to full professor of physics, Ahmad Ali Joraid, Taibah University, Medina, Saudi Arabia.

Professional leaves

1995 Nuclear Solid-State Physics Group, Department of Physics, University of Groningen, The Netherlands (6 months). Research with Frits Pleiter and other members of group of ~20 staff and students.

1996 Nuclear Solid-State Physics Group, Department of Physics, University of Konstanz, Germany (6 months). Research with Manfred Deicher and other members of group of about 30 staff and students belonging to research groups of Professors Ekhard Recknagel and Günter Schatz.

2002 Visits at European universities: Univ. of the Saarlandes (Prof. Dr. Thomas Wichert), Univ. of Paderborn (Prof. Drs. Gerhard Wortmann and Wilfried Holtzapfel), Univ. of Leipzig (Prof. Drs. Tilman Butz and Wolfgang Tröger), Univ. of Göttingen (Prof. Dr. Peter Lieb), Technical Univ. of Vienna (Prof. Dr. Walter Steiner), and Univ. of Vienna (Prof. Drs. Wolfgang Pfeiler and Gero Vogl).

2008 Visits at European universities: Univ. of the Saarlandes (Prof. Dr. Thomas Wichert), Univ. of Leipzig (Prof. Dr. Tilman Butz), Univ. of Hannover (Prof. Dr. Paul Heitjans), Univ. of Muenster (Prof. Drs. Nicolaas Stolwijk and Christian Herzig), and the Helmholtz Zentrum Berlin (formerly Hahn Meitner Institute; Drs. Rainer Sielemann and Heinz-Eckhard Mahnke). Discussions about possible experiments with exotic PAC probes at the online isotope separator and implantation facility ISOLDE, CERN, Geneva, with Manfred Deicher and Thomas Wichert, Uni-Saarlandes. Collaboration with Matthew Zacate, Northern Kentucky University, on *ab initio* calculations of atomistic properties of solids and electric-field gradients using the *WIEN2k* full-potential, all-electron program (see <http://www.wien2k.at/>).

2015 Institute for Materials Physics, University of Münster, Germany, Spring 2015 (four months). Diffusivity measurements were begun on intermetallic compounds for which jump-frequencies had already been determined at WSU using PAC from nuclear quadrupolar relaxation. Principal coworker at Münster is Sergiy Divinski. Seminars were given at Münster (two, Prof. Gerhard Wilde and PD Sergiy Divinski), Hannover (Prof. Paul Heitjans,), Saarbrücken (Prof. Thomas Wichert and PD Manfred Deicher), Leuven

(Prof. Kristiaan Temst, André Vantomme and Guido Langouche) and Ghent (Prof. Stefaan Cottenier).

### Research collaborations

- 1999-04 Mössbauer studies to determine local environments of Fe-cations in muscovites and illites, with Philip Rosenberg, Professor of Geology, WSU.
- 2002-03 Extended x-ray absorption fine structure (XAFS) experiments to determine lattice locations of impurities in intermetallic compounds, in collaboration with Pacific Northwest Consortium Collaborative Access Team (PNC-CAT), Advanced Photon Source, Argonne National Laboratory (principal collaborator: Dale Brewe). August, 2002, November 2002, February 2003.
- 2004-05 NMR studies to determine local environments of various cations in muscovites and illites, with Philip Rosenberg, Professor of Geology, and Dan Mitchell, Ph.D., Assistant Director, Center for NMR Spectroscopy, WSU.
- 2005-08 PAC studies of ZnS, with Philip Rosenberg, Professor of Geology, WSU, and Xiao Wang, Graduate Research Assistant, Physics.
- 2005-08 Luminescence studies of ZnS, with Philip Rosenberg, Prof. of Geology, Xiao Wang, Graduate Student in Physics, Zbigniew Dreger, Research Scientist, Shock Physics Institute, and Baozhou Sun, Postdoctoral Research Associate, Shock Physics Institute.
- 2006-07 Electron spin resonance study of unpaired spins in ZnS samples doped with impurities Cu, Ag, Na and Li., with Philip Rosenberg, Professor of Geology, Xiao Wang, Graduate Student of Physics, and Louis Scudiero, Assistant Professor of Chemistry, WSU.
- 2007-08 Magnetization measurements using a SQUID magnetometer, with You Qiang, Assistant Professor of Physics, University of Idaho.
- 2008- “Radiotracer diffusion in semiconductors and metallic compounds using short-lived isotopes”, Proposal to the ISOLDE and Neutron Time-of-Flight Experiments Committee for beam time, ISOLDE, European Organization for Nuclear Research (CERN proposal stamp CERN-INTC-2009-013 / INTC-P-261), January 18, 2009. Spokesperson: Manfred Deicher. Participants: M. Deicher, G.S. Collins, R. Gerten, J. Kronenbert, M. Türker, F. Wagner, Th. Wichert, H. Wolf and M.O. Zacate. Beam time was awarded in February 2009, and will provide for PAC measurements of jump frequencies of  $^{117}\text{In}$  in host probes in indide compounds to complement current studies on  $^{111}\text{Cd}$ . Matt Zacate participated in a  $^{117}\text{Cd}/\text{In}$  run in November 2010 at CERN.
- 2008- Measurement of jump frequencies of  $^{115}\text{In}$  in NMR probe atoms in rare earth indides via nuclear quadrupole resonance, with Tim Bastow, CSIRO National Laboratory, Melbourne.
- 2008- Computing properties of solids using *WIEN2k*, a full-potential, all-electron, linearized augmented-plane-wave method (<http://www.wien2k.at/>). Collaborative computations carried out here and by Professor Matthew Zacate at Northern Kentucky University, an Adjunct Professor at WSU.
- 2009- “Defect energies and diffusion mechanisms in intermetallics”, Award from the TeraGrid Project, <http://www.teragrid.org>, DMR090131. New Startup allocation of supercomputer time for *WIEN2k* computations, approved August 2009.
- 2010- “Point defects, site preferences and diffusion in intermetallics”, Award from the TeraGrid Project, <http://www.teragrid.org>, renewal of Startup grant DMR090131, for supercomputer time for *WIEN2k* computations, approved August 2010.
- 2011- “Diffusion in intermetallic compounds studied using short-lived radioisotopes”, Proposal to the ISOLDE Committee for beam time, ISOLDE, European Organization for Nuclear Research (CERN proposal stamp CERN-INTC-2011-010 / INTC-P-294), submitted January 5, 2011. Spokesperson, Matthew Zacate. Participants: M.O. Zacate, M. Deicher, K. Johnston, M. Lehnert, F. Strauss, and G.S. Collins. Beam time was awarded in February 2011, and will provide for PAC measurements of jump frequencies of  $^{111\text{m}}\text{Cd}/\text{Cd}$  probe atoms in various compounds to complement current studies using  $^{111}\text{In}/\text{Cd}$  probes. For both probes,



measurements are made for the same 247 keV excited state of  $^{111}\text{Cd}$ , but the parent atom differs, so that the probes might occupy different lattice sites at the time of creation of the excited state. Matt Zacate is expected to make measurements at CERN in the near future.

- 2012- Addendum to ISOLDE proposal P261, "Radiotracer diffusion in semiconductors and metallic compounds using short-lived isotopes" (see under 2008- above).

## PERSONAL PRESENTATIONS

### A. INVITED AND SPECIAL PRESENTATIONS AT CONFERENCES

1. *Anomalous Temperature Dependence of the Quadrupole Coupling Frequency of a Lattice Defect Trapped to  $^{111}\text{In}$  in Pt*, Sixth International Conference on Hyperfine Interactions, Groningen, The Netherlands, 1983. Plenary talk to ~300.
2. *Point Defects in Deformed Metals Studied by Perturbed Gamma-Gamma Angular Correlations*, International Conference on Vacancies and Interstitials in Metals and Alloys, Berlin, 1986. Plenary talk to ~300.
3. *Application of Perturbed Angular Correlations to the Study of Alloys*, US/Japan Seminar on the Electronic Structure and Defects in Alloys, Honolulu, 1987. NSF sponsored workshop attended by invitation only; plenary talk to ~50.
4. *PAC Studies of Electrolytically Charged Metal Cathodes*, Workshop on Cold Fusion Phenomena, Santa Fe, May 1989. Plenary talk to ~200 and broadcast by satellite across the US.
5. *Perturbed  $\gamma\gamma$  Angular Correlations: A Spectroscopy for Point Defects in Metals and Alloys*, Symposium on Hyperfine Interactions and Nuclear Probes in Chemistry, 198<sup>th</sup> Meeting, American Chemical Society, Miami Beach, September 1989. Invited talk.
6. *Defects and Diffusion in Intermetallic Compounds*, XXV School of Physics: Condensed Matter Studies with Nuclear Methods, Zakopane, Poland, May 1990. Invited talk.
7. *Equilibrium Point Defects in NiAl and CoAl*, International Conference on Diffusion and Defects in Solids (DD-91), held onboard a boat travelling from Moscow to Perm along the Volga and Kama Rivers, USSR, June 26 - July 4, 1991 (sponsor: Institute of Metal Physics, Sverdlovsk). Invited talk.
8. *Local Lattice Strains and Defect Reactions in Metals*, International Conference on Diffusion and Defects in Solids (DD-91), Moscow - Perm on the Volga and Kama Rivers, USSR, June 26 - July 4, 1991 (sponsor: Institute of Metal Physics, Sverdlovsk). Plenary talk.
9. *Atomic Diffusion in Strain Fields Near Solute*, Ninth International Conference on Hyperfine Interactions (HFI-IX), Osaka, August 1992. Plenary talk to ~300.
10. *New Method to Study Equilibrium Defects in Intermetallic Compounds*, Symposium on Diffusion in Ordered Alloys and Intermetallic Compounds, TMS Fall Meeting, Chicago, November 1992 (invited contributed paper talk).
11. *Hydrogen Trapping in Vacancies in Metals Studied by PAC*, International Symposium on Local Order in Condensed Matter Physics, Jekyll Island, Georgia, June 14-17, 1993. Invitation-only symposium; plenary talk.
12. *A new approach to study vacancy defects in high-temperature intermetallic compounds*, Symposium on High-Temperature Ordered Alloys, Materials Research Society, Annual Meeting. Boston, November 1994. Plenary talk to ~400.
13. *Atomic defects and disorder in mechanically-milled intermetallic compounds*, International Symposium on Mechanically Alloyed and Nanocrystalline Materials (ISMANAM'95), Quebec City, Canada, July 1995. Plenary talk to ~250.
14. *Point defects in FeAl*, International Conference on Applications of the Mossbauer Effect (ICAME'95), Rimini, Italy, September 1995. Plenary talk to ~300.
15. *Defects in mechanically-milled FeAl*, International Symposium on Mechanically Alloyed and Nanocrystalline Materials (ISMANAM'96), Rome, May 1996. Plenary talk to ~200.
16. *Equilibrium point defects in NiAl and similar B2 intermetallics studied by PAC*, Second International Symposium on Structural Intermetallics, Seven Springs Resort, Champion, PA, September 1997. Plenary talk to ~300. Runner-

up to best paper award.

17. *Thermal defects in B2 iron aluminide*, Materials Research Society Fall Meeting, Boston, December 1998, Symposium KK: High-temperature intermetallic alloys VIII. Plenary talk to ~200.
18. *Hyperfine studies of solids*, Symposium on basic and applied science at the interfaces between nuclear, atomic and condensed matter physics: A celebration in honor of the 65<sup>th</sup> birthday of Noémie Benczer-Koller, Physics Department, Rutgers University, New Brunswick, NJ, May 1, 1999. Invited talk to an audience of about fifty students and colleagues of my former Ph.D. research advisor.
19. *Can impurities in binary alloys nucleate phase embryos?*, 15<sup>th</sup> International Symposium on Nuclear Quadrupole Interactions, July 1999, Leipzig. Plenary talk to audience of about 150.
20. *Vacancy Jumps in PdIn: Reconciling Nuclear Relaxation and Diffusion Measurements*, Fifth International Conference on Diffusion in Materials, Paris, July 2000. Plenary talk to audience of about 200.
21. *Hyperfine studies of point defects in intermetallic compounds*, Symposium 27: Nuclear hyperfine and exotic particle techniques for studying chemical states, International Chemical Congress of Pacific Basin Societies, Pacificchem 2000, Honolulu, December 2000. Invited talk to an audience of ~40.
22. *Atom movement in solids studied using nuclear quadrupole relaxation*, Fifth meeting of the Northwest Section of the American Physical Society, Pullman/Moscow, May 2004, Session J1.001; with Aurélie Favrot, Li Kang, Egbert Nieuwenhuis, Denys Solodovnikov, Jipeng Wang and Matthew O. Zacate. Invited talk.
23. *Diffusion in intermetallic compounds studied using nuclear quadrupole relaxation*, International Conference on Diffusion in Materials (DIMAT 2004), 5<sup>th</sup> meeting, Krakow, Poland, July 19-23, 2004. With Aurélie Favrot, Li Kang, Denys Solidovnikov and Matthew O. Zacate. Oral presentation to an audience of ~120.
24. *PAC probes as diffusion tracers in solids*, International Conference on Hyperfine Interactions (HFI 2004) 13<sup>th</sup> meeting, Bonn, Germany, August 23-27, 2004. With Aurélie Favrot, Li Kang, Egbert Rein Nieuwenhuis, Denys Solidovnikov, Jipeng Wang and Matthew O. Zacate. Plenary invited talk to audience of ~200. A PDF version is available at <http://defects.physics.wsu.edu/HFI-2004-tracers.pdf>.
25. *Nonstoichiometry in line compounds*, International Conference on Nonstoichiometric Compounds, Kauai, Hawai'i, April 13-18, 2005. Plenary oral presentation to an audience of ~150. A PDF version is available at <http://defects.physics.wsu.edu/Nonstoichiometry.pdf>.
26. *Atom scale studies of solids using hyperfine interactions*, Symposium on Point Defects in Materials, 2006 Annual Meeting of the Minerals, Metals and Materials Society (TMS), San Antonio, March 12-16, 2006. Invited talk.
27. *Simultaneous measurement of tracer jump frequencies on different sublattices in Ga<sub>7</sub>Pd<sub>3</sub> using PAC*, International Conference on Diffusion and Stresses, Lillafüred, Hungary, September 19-22, 2006 (DS2006). With Egbert Nieuwenhuis and Matthew O. Zacate. Plenary oral presentation to audience of ~40.
28. *Site preferences of <sup>111</sup>In probe atoms in intermetallics having the Al<sub>3</sub>Ti or Al<sub>3</sub>Zr crystal structures*, 14th International Conference on Hyperfine Interactions, Iguassu Falls, Brazil, August 6-10, 2007. With John P. Bevington and Farida Selim. Plenary oral presentation to an audience of ~100.
29. *Hyperfine interaction studies of local environments of probe atoms in intermetallic compounds*, International Workshop on Research Reactor Utilization: 50 years of Safe and Sustainable Operation of the IEA-R1 Research Reactor, São Paulo, Brazil, December 3-6, 2007. Workshop link: <http://bemtevi2.ipen.br/sitio/?idc=1969>. Invited plenary presentation to about 40 attendees.
30. *Motion of cadmium tracer atoms in Al<sub>11</sub>R<sub>3</sub> phases*, Seventh International Conference on Diffusion in Materials, Lanzarote (DIMAT 2008), Canary Islands, October 28-31, 2008. With Stephanie Lage. Oral presentation to an audience of ~30. [http://www.ucm.es/info/tuma/quimicas\\_superficie/dimat1.html](http://www.ucm.es/info/tuma/quimicas_superficie/dimat1.html)
31. *Atom movement in solids studied using PAC spectroscopy*, 11<sup>th</sup> Annual Meeting of the Northwest Section of the American Physical Society, Vancouver, BC, May 14-16, 2009. Invited plenary presentation to an audience of about 30. <http://www.physics.ubc.ca/apsnw/>
32. *Diffusion in binary and pseudo-binary L1<sub>2</sub> indides, stannides, gallides and aluminides of rare-earth elements as studied using perturbed angular correlation of <sup>111</sup>In/Cd*, Eighth International Conference on Diffusion in Materials (DIMAT2011), Dijon, France, July 3-8, 2011. With Randal Newhouse and Justine Minish. Keynote speech. <http://www.dimat2011.com/>
33. *Nuclear quadrupole interactions of <sup>111</sup>In/Cd solute atoms in a series of rare-earth palladium alloys*, Qiaoming

- Wang and Gary S. Collins, Fourth Joint International Conference on Hyperfine Interactions and International Symposium on Nuclear Quadrupole Interactions, Beijing, Sept. 10-14, 2012. With Qiaoming Wang. Invited plenary oral presentation to an audience of ~50. <http://cnps.ac.cn/hfi2012/>
34. *Solute-solute interactions in intermetallic compounds*, Gary S. Collins, with Debashis Banerjee and Ryan Murray. Presented at the International Conference on Hyperfine Interactions and Their Applications, Leuven, Belgium, July 2016, submitted to Hyperfine Interactions (Springer). Plenary [PechaKucha](#) talk to an audience of about 100. <http://www.hyperfine2016.be>. Slides of the presentation are at [https://iks32.fys.kuleuven.be/files/hyperfine2016\\_slides/09\\_PechaKucha-1.2\\_Collins.pdf](https://iks32.fys.kuleuven.be/files/hyperfine2016_slides/09_PechaKucha-1.2_Collins.pdf). The presentation starts at 12:39 in the video at <https://videolab.avnet.kuleuven.be/video/?id=eec5383c19ce8368758b0b403e9f6552>.
  35. *Nuclear Methods in Solids*, Gary S. Collins, Symposium on 50 years of excellence in nuclear physics graduate education at Rutgers University, Department of Physics, Rutgers University, Piscataway, NJ, October 1, 2016. A celebration of the 50 years and of the retirement of Professor Noémie Benczer-Koller, Collins's PhD research advisor. Brief invited contribution.
  36. *Determining the correlation coefficient for impurity diffusion in an intermetallic compound*, Ryan Murray, Gary S. Collins, Bengü Tas Kavakbasi and Sergiy Divinski; 13<sup>th</sup> International Conference on Diffusion in Liquids and Solids (DSL 17), Vienna, June 2017, invited contribution.

## B. INTERNATIONAL CONFERENCES

1. *Effects of Probe Valence on the Conduction-Electron Electric-Field Gradient in the Non-Cubic Metals*, Fourth International Conference on Hyperfine Interactions, Drew University, Madison, NJ, July 1977. Poster paper.
2. *Hyperfine Field Distributions at  $^{111}\text{Cd}$  Probes in Nickel Alloys: I. Nontransition Metal Solutes Cu and Si*, Fifth International Conference on Hyperfine Interactions, Berlin, July 1980. Poster paper.
3. *Hyperfine Field Distributions at  $^{111}\text{Cd}$  Probes in Nickel Alloys: II. Transition Metal Solutes Fe, Co, Mn and Rh*, Fifth International Conference on Hyperfine Interactions, Berlin, July 1980. Poster paper.
4. *Critical Behavior of Quenched, Randomly Disordered Ni and Fe Alloys*, with A. R. Chowdhury, C. Allard, R. M. Suter and C. Hohenemser, Fifth International Conference on Hyperfine Interactions, Berlin, July 1980. Poster paper.
5. *Deuterium Desorption and Host Interstitial Clustering in d-irradiated Ni*, with C. Allard and C. Hohenemser, International Symposium on the Electronic Structure and Properties of Hydrogen in Metals, Richmond, March 1982. Poster paper.
6. *Anomalous Temperature Dependence of the Quadrupole Coupling Frequency of a Lattice Defect Trapped to  $^{111}\text{In}$  in Pt*, with R. B. Schuhmann, Sixth International Conference on Hyperfine Interactions, Groningen, The Netherlands, July 1983. Plenary talk to ~300.
7. *Trivacancy Recovery and Formation of a Cubic Symmetry Defect Trap on  $^{111}\text{In}$  Impurities in Ni*, with R. B. Schuhmann, Sixth International Conference on Hyperfine Interactions, Groningen, The Netherlands, July 1983. Poster paper.
8. *Comparison of Defect Recovery in Proton-Irradiated, Deformed and Ion Implanted Nickel as Observed by PAC of  $^{111}\text{In}$* , with C. Allard and C. Hohenemser, Sixth International Conference on Hyperfine Interactions, Groningen, The Netherlands, July 1983. Poster paper.
9. *Nuclear Spin Relaxation of  $^{161}\text{Dy}$  Above the Curie Temperature Observed by the Mössbauer Effect*, with A. R. Chowdhury and C. Hohenemser, Sixth International Conference on Hyperfine Interactions, Groningen, The Netherlands, July 1983. Poster paper.
10. *Observation of *in situ* Transformation Between Two Divacancy Traps During Recovery of Deformed Gold*, with C. Allard, R. B. Schuhmann and C. Hohenemser, Sixth International Conference on Hyperfine Interactions, Groningen, The Netherlands, July 1983. Poster paper.
11. *Point Defects in Deformed Metals Studied by Perturbed Gamma-Gamma Angular Correlations*, International Conference on Vacancies and Interstitials in Metals and Alloys, Berlin, September 1986. Plenary talk to ~300.

12. *Hydrogen-Vacancy Interactions in Ni Studied by Perturbed Angular Correlations*, with R. B. Schuhmann, International Conference on Vacancies and Interstitials in Metals and Alloys, Berlin, September 1986. Poster paper.
13. *Perturbed Angular Correlations Studies of Alloys*, U.S.-Japan Seminar on the Electronic Structure and Lattice Defects in Alloys, Honolulu, May 1987. Plenary talk at invitation-only workshop.
14. *Hydrogen Decoration of Vacancy Complexes in Platinum*, with H.-J. Jang and S. L. Shropshire, NATO Advanced Study Institute: Nuclear Physics Applications on Materials Science, Viana do Castelo, Portugal, September 1987. Poster paper.
15. *Diffusion and Trapping of Hydrogen in Vacancies in Platinum Studied by PAC*, with S. L. Shropshire and H.-J. Jang, International Conference on Diffusion in Metals and Alloys (DIMETA-88), Balatonfured, Hungary, September 1988. Poster paper.
16. *PAC Studies of Electrolytically Charged Metal Cathodes*, with S. L. Shropshire and J. Fan, Workshop on Cold Fusion Phenomena, Santa Fe, May 1989. Plenary talk to ~400 and satellite broadcast.
17. *Deuteron Tunneling at Electron-Volt Energies*, with J. W. Norbury and J. S. Walker, Workshop on Cold Fusion Phenomena, Santa Fe, May 1989. Poster paper.
18. *Production and Migration of Interstitials in Deformed Metals*, with S. L. Shropshire, Eighth International Conference on Hyperfine Interactions, Prague, August 1989. Poster paper.
19. *Cage Motion of a Probe Atom in a Vacancy Complex in Pt*, with S. L. Shropshire and H.-J. Jang, Eighth International Conference on Hyperfine Interactions, Prague, August 1989. Poster paper.
20. *Point Defects in NiAl Near the Equiatomic Composition*, with J. Fan, Eighth International Conference on Hyperfine Interactions, Prague, August 1989. Poster paper.
21. *Stacking Fault Defects in HCP Cobalt Studied by PAC*, with G. McGhee, Eighth International Conference on Hyperfine Interactions, Prague, August 1989. Poster paper.
22. *Electrolytic Loading of Hydrogen in Metals Studied by PAC*, with G. McGhee, S. L. Shropshire, H.-J. Jang, J. Fan and R. B. Schuhmann, Eighth International Conference on Hyperfine Interactions, Prague, Aug 1989. Poster paper.
23. *Laser-Surface Melting of Metals Studied by PAC*, with K. Zainun, Eighth International Conference on Hyperfine Interactions, Prague, August 1989. Poster paper.
24. *Defects and Diffusion in Intermetallic Compounds*, with J. Fan, XXV School of Physics: Condensed Matter Studies with Nuclear Methods, Zakopane, Poland, May 1990. Invited talk.
25. *Equilibrium Point Defects in NiAl and CoAl*, with J. Fan, International Conference on Diffusion and Defects in Solids (DD-91), Moscow - Perm on the Volga and Kama Rivers, USSR, June 1991; sponsored by the Institute of Metal Physics, Sverdlovsk. Invited talk.
26. *Local Lattice Strains and Defect Reactions in Metals*, with S. L. Shropshire, International Conference on Diffusion and Defects in Solids (DD-91), held on board boat traveling from Moscow to Perm on the Volga and Kama Rivers, USSR, June 1991; sponsored by the Institute of Metal Physics, Sverdlovsk. Plenary talk to ~125.
27. *Application of PAC to study equilibrium point defects in intermetallic compounds*, Gary S. Collins and Jiawen Fan, Ninth Int'l Conference on Hyperfine Interactions, Osaka, August 1992. Poster paper.
28. *Equilibrium point defects in TiAl studied by PAC*, Jiawen Fan and Gary S. Collins, Ninth Int'l Conference on Hyperfine Interactions, Osaka, August 1992. Poster paper.
29. *Hydrogen binding in vacancy clusters in platinum*, Steven L. Shropshire and Gary S. Collins, Ninth Int'l Conference on Hyperfine Interactions, Osaka, August 1992. Poster paper.
30. *Atomic diffusion in strain fields near solutes*, Steven L. Shropshire and Gary S. Collins, Ninth Int'l Conference on Hyperfine Interactions, Osaka, August 1992. Plenary talk.
31. *Grain boundary sites in fcc metals studied by PAC*, Bin Bai and Gary S. Collins, Ninth Int'l Conference on Hyperfine Interactions, Osaka, August 1992. Poster paper.
32. *The martensitic phase transition in NiTi*, John C. Sy and Gary S. Collins, Ninth Int'l Conference on Hyperfine Interactions, Osaka, August 1992. Poster paper.
33. *Indium metal nanoclusters studied by PAC*, Praveen Sinha and Gary S. Collins, Ninth Int'l Conference on Hyperfine Interactions, Osaka, August 1992. Poster paper.

34. *New Technique for Studying Equilibrium Defects in Intermetallic Compounds*, Gary S. Collins and Jiawen Fan, Symposium on Defects in Ordered Alloys and Intermetallic Compounds, TMS Fall Meeting, Chicago, November 1992. Plenary talk to ~35.
35. *Hydrogen Trapping in Vacancies in Metals Studied by PAC*, International Symposium on Local Order in Condensed Matter Physics, Jekyll Island, Georgia, June 14-17, 1993. Invitation-only symposium; plenary talk.
36. *Formation of FeCo by Mechanical Alloying*, Bruce H. Meeves and Gary S. Collins, Int'l Conf. on Applications of the Mössbauer Effect (ICAME'93), Vancouver, BC, August 9-14, 1993. Poster paper.
37. *Formation of Ni<sub>3</sub>Fe by Mechanical Alloying*, Gary S. Collins and Bruce H. Meeves, Int'l Conf. on Applications of the Mössbauer Effect (ICAME'93), Vancouver, BC, August 9-14, 1993. Poster paper.
38. *Development of atomic defects and disorder during mechanical-milling of intermetallic compounds*, with Praveen Sinha, International Symposium on Mechanically Alloyed and Nanocrystalline Materials (ISMANAM'95), Quebec City, Canada, July 1995. Plenary talk to ~300.
39. *Point defects in B2 intermetallic compounds*, with Praveen Sinha and Ming-Zhong Wei, 10<sup>th</sup> International Conference on Hyperfine Interactions, Leuven, August 1995. Poster paper.
40. *Point defects in FeAl*, with Luke S.J. Peng, International Conference on Applications of the Mössbauer Effect - 1995, Rimini, September 1995; Plenary talk to ~300.
41. *Defects in mechanically-milled FeAl*, with Luke S.J. Peng, International Symposium on Mechanically Alloyed and Nanocrystalline Materials (ISMANAM'96), Rome, May 1996. Plenary talk to ~200.
42. *Studies of defects in structural intermetallics at ISAC*, Workshop on Experiments and Equipment at Isotope Separators (WEEIS), TRIUMF, Vancouver, BC, April 1997. Plenary talk.
43. *Equilibrium point defects in NiAl and similar B2 intermetallics studied by PAC*, with Jiawen Fan and Bin Bai, Second International Symposium on Structural Intermetallics, Seven Springs Mountain Resort, Champion, PA, September 1997. Plenary talk to an audience of about 200. Runner-up to best paper award.
44. *Vacancy mobility at high temperature in Ni-rich NiAl*, with Bin Bai, Second International Symposium on Structural Intermetallics, Seven Springs Resort, Champion, PA, September 1997. Late news poster paper.
45. *Vacancy mobility in nickel aluminide versus composition*, with Bin Bai and Jiawen Fan, Materials Research Society Spring Meeting, April 1998, Symposium Z: Diffusion mechanisms in crystalline materials. Plenary talk to an audience of about 40.
46. *Stochastic vacancy motion in B2 intermetallics studied by PAC*, with Bin Bai, Harmen Thys Nieuwenhuis, Mingzhong Wei and William E. Evenson, Materials Research Society Spring Meeting, April 1998, Symposium Z: Diffusion mechanisms in crystalline materials. Poster paper.
47. *Equilibrium defects and concentrations in nickel aluminide*, with Bin Bai, Materials Research Society Fall Meeting, December 1998, Symposium KK: High-temperature intermetallic alloys VIII. Poster paper.
48. *Thermal defects in B2 iron aluminide*, with Luke S.-J. Peng and Mingzhong Wei, Materials Research Society Fall Meeting, December 1998, Symposium KK: High-temperature intermetallic alloys VIII. Plenary talk to an audience of about 200.
49. *Can impurities in binary alloys nucleate phase embryos?*, with Luke S.-J. Peng and Matthew O. Zacate, 15<sup>th</sup> International Symposium on Nuclear Quadrupole Interactions, July 1999, Leipzig. Plenary talk to ~150.
50. *Vacancy Jumps in PdIn: Reconciling Nuclear Relaxation and Diffusion Measurements*, with Harmen Thys Nieuwenhuis, Fifth International Conference on Diffusion in Materials (DIMAT2000), Paris. Plenary talk to ~200.
51. *Vacancy-Vacancy Interactions in NiAl*, with Matthew O. Zacate, Fifth International Conference on Diffusion in Materials (DIMAT2000), Paris. Poster paper.
52. *Hyperfine studies of point defects in intermetallic compounds*, Symposium 27: Nuclear hyperfine and exotic particle techniques for studying chemical states, International Chemical Congress of Pacific Basin Societies, Pacificchem 2000, Honolulu, December 2000. Invited talk to ~40.
53. *Site preference model for hyperfine impurities in compounds*, 12<sup>th</sup> International Conference on Hyperfine Interactions, Park City, Utah, August 2001. Poster paper.
54. *Stochastic model of PAC nuclear relaxation caused by defects hopping on a simple cubic lattice*, 12<sup>th</sup> International

- Conference on Hyperfine Interactions, Park City, Utah, August 2001. Poster paper.
55. *Influences of lattice sinks and defect interactions on solutes in compounds*, with Matthew O. Zacate, Spring Meeting, Materials Research Society, San Francisco, April 2002, Symposium F. Poster paper.
  56. *Twenty-five years of defect studies*, in Toward a sustainable world: physics and technology assessment, a symposium in celebration of the research and teaching of Christoph Hohenemser, Clark University, Worcester, MA, April 19-20, 2002.
  57. *Diffusion in intermetallic compounds studied using nuclear quadrupole relaxation*, with Aurélie Favrot, Li Kang, Denys Solodovnikov and Matthew O. Zacate, International Conference on Diffusion in Materials (DIMAT-2004), Krakow, Poland, July 19-23 2004. Oral presentation to an audience of ~120.
  58. *Jump frequency of Cd tracer atoms in  $\beta$ -Mn*, with Matthew O. Zacate, International Conference on Diffusion in Materials (DIMAT-2004), Krakow, Poland, July 19-23 2004. Poster paper.
  59. *PAC probes as diffusion tracers in solids*, Joint meeting of the 13<sup>th</sup> International Conference on Hyperfine Interactions and 17<sup>th</sup> International Symposium on Nuclear Quadrupole Interactions (HFI2004), Bonn, Germany, August 23-27, 2004. Plenary invited presentation to an audience of ~200. A PDF version is available at <http://defects.physics.wsu.edu/HFI-2004-tracers.pdf>.
  60. *Polymorphic phase transformation in  $In_2La$  and  $CeIn_2$* , Joint meeting of the 13<sup>th</sup> International Conference on Hyperfine Interactions and 17<sup>th</sup> International Symposium on Nuclear Quadrupole Interactions (HFI2004), Bonn, Germany, August 23-27, 2004. Poster paper. <http://defects.physics.wsu.edu/papers/CeIn2.pdf>
  61. *Nonstoichiometry in line compounds*, International Conference on Nonstoichiometric Compounds, Kaua'i, Hawai'i, April 3-8, 2005. Plenary oral presentation to an audience of ~150. A PDF version is available at <http://defects.physics.wsu.edu/Nonstoichiometry.pdf>.
  62. *Atom-scale studies of solids using hyperfine interactions*, Symposium on Point Defects in Materials, 2006 TMS Annual Meeting, San Antonio, March 12-16, 2006. Invited presentation.
  63. *Simultaneous measurement of tracer jump frequencies on different sublattices in  $Ga_7Pd_3$  using PAC*, International Conference on Diffusion and Stresses, Lillafüred, Hungary, September 19-22, 2006 (DS2006). Plenary oral presentation to an audience of ~40.
  64. *Site preferences of  $^{111}In$  probe atoms in intermetallics having the  $Al_3Ti$  or  $Al_3Zr$  crystal structures*, 14th International Conference on Hyperfine Interactions, Iguassu Falls, Brazil, August 6-10, 2007. With John P. Bevington and Farida Selim. Plenary oral presentation to an audience of ~100. <http://www.fisica.unlp.edu.ar/hfi2007/>
  65. *Diffusion of  $^{111}Cd$  probes in  $Ga_7Pt_3$  studied by nuclear quadrupole relaxation*, 14th International Conference on Hyperfine Interactions, Iguassu Falls, Brazil, August 6-10, 2007. With Farida Selim and John P. Bevington. Poster presentation. <http://www.fisica.unlp.edu.ar/hfi2007/>
  66. *Hyperfine interaction studies of local environments of probe atoms in intermetallic compounds*, International Workshop on Research Reactor Utilization: 50 years of Safe and Sustainable Operation of the IEA-R1 Research Reactor, Sao Paulo, Brazil, December 3-6, 2007. Workshop link: <http://bemtevi2.ipen.br/sitio/?idc=1969>. Invited presentation.
  67. *Motion of cadmium tracer atoms in  $Al_{11}R_3$  phases*, Seventh International Conference on Diffusion in Materials, Lanzarote (DIMAT 2008), Canary Islands, October 28-31, 2008. With Stephanie Lage. Oral presentation to an audience of ~30. [http://www.ucm.es/info/tuma/quimicas\\_superficie/dimat1.html](http://www.ucm.es/info/tuma/quimicas_superficie/dimat1.html)
  68. *Jump frequencies of cadmium tracer atoms in  $L1_2$  rare-earth gallides*, Seventh International Conference on Diffusion in Materials, Lanzarote (DIMAT 2008), Canary Islands, October 28-31, 2008. With Xia (Sean) Jiang. Oral presentation to an audience of ~30. [http://www.ucm.es/info/tuma/quimicas\\_superficie/dimat1.html](http://www.ucm.es/info/tuma/quimicas_superficie/dimat1.html)
  69. *Diffusion in binary and pseudo-binary  $L1_2$  indides, stannides, gallides and aluminides of rare-earth elements as studied using perturbed angular correlation of  $^{111}In/Cd$* , Eighth International Conference on Diffusion in Materials (DIMAT2011), Dijon, France, July 2011. With Randal Newhouse and Justine Minish. Keynote speech. <http://www.dimat2011.com/>
  70. *PAC studies of liquid gallium supercooled down to 10K and measurements of solubility of indium in supercooled liquid gallium*, Eighth International Conference on Diffusion in Materials (DIMAT2011), Dijon, France, July 2011. With Xiangyu Yin. Poster presentation. <http://www.dimat2011.com/>
  71. *Nuclear quadrupole interactions of  $^{111}In/Cd$  solute atoms in a series of rare-earth palladium alloys*, Fourth Joint

- International Conference on Hyperfine Interactions and International Symposium on Nuclear Quadrupole Interactions, Beijing, Sept. 10-14, 2012. With Qiaoming Wang. Invited plenary oral presentation to an audience of ~50. <http://cnps.ac.cn/hfi2012/>
72. *Determination of the crystal structures of In70-Ni30 and In70-Pd30 using perturbed angular correlation*, Fourth Joint International Conference on Hyperfine Interactions and International Symposium on Nuclear Quadrupole Interactions, Beijing, Sept. 10-14, 2012. With Lee Aspirtarte and Egbert R. Nieuwenhuis. Poster paper. <http://cnps.ac.cn/hfi2012/>
73. *Solute-solute interactions in intermetallic compounds*, presented at the International Conference on Hyperfine Interactions and Their Applications, Leuven, Belgium, July 2016, with Debashis Banerjee and Ryan Murray. Submitted to Hyperfine Interactions (Springer). Plenary [PechaKucha](http://www.hyperfine2016.be) talk to an audience of about 100. <http://www.hyperfine2016.be>. Slides of the presentation are at [https://iks32.fys.kuleuven.be/files/hyperfine2016\\_slides/09\\_PechaKucha-1.2\\_Collins.pdf](https://iks32.fys.kuleuven.be/files/hyperfine2016_slides/09_PechaKucha-1.2_Collins.pdf). The presentation starts at 12:39 in the video at <https://videolab.avnet.kuleuven.be/video/?id=eec5383c19ce8368758b0b403e9f6552>.
74. *Determining the correlation coefficient for impurity diffusion in an intermetallic compound*, Ryan Murray, [Gary S. Collins](http://hdl.handle.net/2376/12222), Bengü Tas Kavakbasi and Sergiy Divinski; 13<sup>th</sup> International Conference on Diffusion in Liquids and Solids (DSL 17), June 2017. Slides are available at <http://hdl.handle.net/2376/12222>.

### C. NATIONAL MEETINGS

1. *Temperature Dependence of the Nuclear Quadrupole Interaction in Tin Metal*, with N. Benczer-Koller, American Physical Society, Spring Meeting, Washington, April 1975; Bull. Am. Phys. Soc. 20, 609 (1975).
2. *Temperature Dependence of the Conduction Electron EFG in Tin Metal*, American Physical Society, Annual Meeting, New York, January 1976; Bull. Am. Phys. Soc. 21, 22 (1976).
3. *Valence Effect on the Conduction Electron Electric-Field Gradient in Noncubic Metals*, American Physical Society, Spring Meeting, Washington, April 1977; Bull. Am. Phys. Soc. 22, 532 (1977).
4. *Critical Behavior of Disordered FeAl Alloys*, with A. R. Chowdhury and C. Hohenemser, American Physical Society March Meeting, Dallas, 1982; Bull. Am. Phys. Soc. 27, 354 (1982).
5. *Vacancy Defects in Plastically Deformed Gold*, with C. Allard, American Physical Society March Meeting, Dallas, 1982; Bull. Am. Phys. Soc. 27, 154 (1982).
6. *Laser Annealing of Ni Plated with <sup>111</sup>In*, with C. Allard, C. Hohenemser and C. W. Draper, American Physical Society March Meeting, Dallas, 1982; Bull. Am. Phys. Soc. 27, 324 (1982).
7. *Detrapping of Hydrogen Atoms from a Multi-Vacancy Trap in Ni*, with R. B. Schuhmann, American Physical Society March Meeting, Las Vegas, 1986; Bull. Am. Phys. Soc. 31, 272 (1986).
8. *Defects in Laser Surface-Melted Metals Studied by PAC*, with C. Allard, C. Hohenemser and C. W. Draper, Materials Research Society, Annual Meeting, Boston, December 1986. Poster paper.
9. Gordon Conference: Particle-Solid Interactions, Holderness School, July 1988 (2 poster papers).
10. *Recovery of Point Defects in Platinum Studied by Perturbed  $\gamma\gamma$  Angular Correlations*, with S. L. Shropshire and H.-J. Jang, Symposium on Irradiation-Enhanced Materials Science and Engineering, The Minerals, Metals and Materials Society, Fall Meeting, Chicago, September 1988. Poster paper.
11. Gordon Conference: Metal Hydrides, Tilton School, July 1989 (poster paper).
12. *PAC: a spectroscopy for point defects in metals and alloys*, with S. L. Shropshire and J. Fan, [Symposium on Hyperfine Interactions and Nuclear Probes in Chemistry, 198<sup>th</sup> Meeting, American Chemical Society](http://www.amchem.org/1989), Miami Beach, September 1989. Invited talk.
13. *Bottleneck to Vacancy Annealing in Ordered NiAl*, with Jiawen Fan, American Physical Society March Meeting, Cincinnati, 1991; Bull. Am. Phys. Soc. 36, 577 (1991).
14. *Vacancy defects in mechanically-milled intermetallic compounds*, with Praveen Sinha, [Symposium on novel techniques in synthesis and processing of advanced materials, The Metallurgical Society](http://www.tms.org), Fall Meeting, Rosemont, Illinois, October 1994. Contributed talk.

15. *A new approach to study vacancy defects in high-temperature intermetallic compounds*, with Praveen Sinha, Symposium on high-temperature ordered alloys, Materials Research Society Annual Meeting, Boston, November 1994. Plenary talk to ~400.
16. *Atomic Defects and Disorder in Mechanically-Milled Nanocrystalline Intermetallic Compounds Studied by PAC*, with Praveen Sinha, Symposium on Structure and Properties of Nanophase Materials, TMS Spring Meeting, Las Vegas, February 12-16, 1995.
17. *Hyperfine studies of solids*, Symposium on basic and applied science at the interfaces between nuclear, atomic and condensed matter physics: A celebration in honor of the 65<sup>th</sup> birthday of Noémie Benczer-Koller, Physics Department, Rutgers University, New Brunswick, NJ, May 1, 1999.
18. *Equilibrium defects and solute site preferences in intermetallics: I. Thermodynamics*, with Matthew Zacate, March Meeting, American Physical Society, Seattle, 2001.
19. *Thermally driven change in sites occupied by indium solutes in GdAl<sub>2</sub>*, March Meeting, American Physical Society, Austin, 2003: Session S16 - Metals: Defects to Alloys [S16.009].
20. *Diffusion of Cd in REIn<sub>3</sub> (RE=La, Nd, Gd) measured using PAC*, March Meeting, American Physical Society, Austin, 2003: Session S16 - Metals: Defects to Alloys [S16.008].
21. *Diffusivity of Cd in beta-Mn and beta-Mn(Al) studied by PAC*, March Meeting, American Physical Society, Austin, 2003: Session V35 - Metals: Synthesis and Measurement [V35.016].
22. *An interpretation of octahedral ordering and site occupancies of Fe<sup>2+</sup> in muscovite and illite*, with Philip Rosenberg, Geology, WSU, Clay Minerals Society 41<sup>st</sup> Annual Meeting, Richland, Washington, June 19-24, 2004 (Powerpoint presentation at <http://defects.physics.wsu.edu/papers/CMS-04-Illite-Symp.pdf>).

#### D. REGIONAL MEETINGS

1. *Electric-Field Gradient in Tin as a Function of Temperature*, Second North-East Hyperfine Interactions Conference, Rutgers, May 1976.
2. *First Measurements of Hyperfine Field Shifts in Magnetic Alloys by PAC*, Third North-East Hyperfine Interactions Conference, Rutgers, May 1979.
3. *Vacancy Trapping in Plastically Deformed Metals*, with G. P. Stern and C. Hohenemser, American Physical Society, New England Section Meeting, Worcester, April 1981; Bull. Am. Phys. Soc. 26, 795 (1981).
4. *Vacancy Trapping in Plastically Deformed Metals Studied by Perturbed Angular Correlations of <sup>111</sup>Cd*, with G. P. Stern and C. Hohenemser, Fourth North-East Hyperfine Interactions Conference, Boston University, May 1981.
5. *Point Defect Production and Annealing in Plastically Deformed Ni in the Range 300-450 K*, with G. Stern and R. B. Schuhmann, Fifth North-East Hyperfine Interactions Conference, SUNY, Stonybrook, June 1982.
6. *Defects Recovering in Deformed Au Observed by PAC of <sup>111</sup>In*, with C. Allard and R. B. Schuhmann, Fifth North-East Hyperfine Interactions Conference, SUNY, Stonybrook, June 1982.
7. *Vacancy Defects in Metals Studied by Perturbed Gamma-Gamma Angular Correlations*, Transfer Technology Symposium: Materials Environmental Interactions, Pacific Northwest Laboratories, Richland, September 1986.
8. *Hydrogen-Vacancy Interactions in Ni Studied by Perturbed Gamma-Gamma Angular Correlations*, Transfer Technology Symposium: Materials Environmental Interactions, Pacific Northwest Laboratories, Richland, September 1986.
9. *Point Defects in Metals Studied by Perturbed Angular Correlations*, Tenth Northwest Meeting on Condensed Matter Physics, University of Washington, May 1988.
10. *Point Defects in Intermetallic Compounds Studied by PAC*, Fourteenth Northwest Meeting on Condensed Matter Physics, University of Washington, October 1996.
11. *Phase embryos nucleated by impurity atoms*, First meeting of the Northwest Section of the American Physical Society, Vancouver, BC, May 1999; with Luke S.-J. Peng.
12. *Atom movement in solids studied using nuclear quadrupole relaxation*, Fifth meeting of the Northwest Section of the American Physical Society, Pullman/Moscow, May 2004, with Aurélie Favrot, Li Kang, Egbert Nieuwenhuis, Denys Solodovnikov, Jipeng Wang and Matthew O. Zacate. Invited paper. Session J1.001.



13. [Atom movement in solids studied using PAC spectroscopy](http://meetings.aps.org/Meeting/NWS09/Event/106771), 11<sup>th</sup> Annual Meeting of the Northwest Section of the American Physical Society, Vancouver, BC, May 14-16, 2009. Invited talk.  
<http://meetings.aps.org/Meeting/NWS09/Event/106771>
14. [Composition dependence of jump frequencies in pseudo-binary phases](#), NWS10 Meeting of the American Physical Society, Walla Walla, Washington, October 2, 2010; with Randal Newhouse. Contributed talk abstract H3.00010.

## E. SEMINARS, COLLOQUIA AND OTHER MEETINGS

1. *Temperature Dependence of the Nuclear Quadrupole Interaction in Tin Metal*: Seminar, U.S. Army Electronics Command, Red Bank, NJ, June 1977.
2. *Temperature Dependence of the Nuclear Quadrupole Interaction in Tin Metal*: Special Colloquium, Physics Department, Clark University, June 1977.
3. *Studies of Microscopic Magnetic and Chemical Interactions in Ferromagnetic Alloys by Perturbed Angular Correlations*: Physics Colloquium, Clark University, October 1979.
4. *Hyperfine-Field Distributions in Nickel Alloys Studied by Perturbed Angular Correlations*: Solid-State Seminar, Boston University, October 1979.
5. *Hyperfine Interactions Studies of Lattice Defects in Metals*: Physics Colloquium, Clark University, September 1980.
6. *Vacancy Defects in Deformed Metals Studied by Hyperfine Interactions*: Solid-State Seminar, Boston University, March 1981.
7. *An Atom's Eye View of Lattice Defects in Metals*: Colloquium, North Adams State College, North Adams, MA, December 1983.
8. *Atomic-Scale Studies of Point Defect Migration and Defect Reactions in Metals*: Colloquium, Physics Department, Florida Atlantic University, Boca Raton, January 1985.
9. *Atomic-Scale Studies of Point Defect Migration and Defect Reactions in Metals*: Colloquium, Physics Department, Virginia Commonwealth University, Richmond, January 1985.
10. *Atomic-Scale Studies of Point Defect Migration and Defect Reactions in Metals*: Colloquium, Department of Physics, Washington University, St. Louis, February 1985.
11. *Atomic-Scale Studies of Point Defect Migration and Defect Reactions in Metals*: Physics Colloquium, Clark University, February 1985.
12. *Atomic-Scale Studies of Point Defect Migration and Defect Reactions in Metals*: Colloquium, Physics Department, Southern Illinois University, Carbondale, March 1985.
13. *Atomic-Scale Studies of Point Defect Migration and Defect Reactions in Metals*: Colloquium, Physics Department, University of Missouri at Rolla, March 1985.
14. *Atomic-Scale Studies of Point Defect Migration and Defect Reactions in Metals*: Physics Colloquium, Department of Physics, Washington State University, Pullman, April 1985.
15. *Atomic-Scale Studies of Point Defect Migration and Defect Reactions in Metals*: Colloquium, Department of Physics, Oregon State University, Corvallis, April 1985.
16. *Atomic-Scale Studies of Point Defect Migration and Defect Reactions in Metals*: Colloquium, Department of Physics, Worcester Polytechnic Institute, April 1985.
17. *Defect Chemistry in Metals: Interactions between Vacancies, Interstitials and Impurity Atoms*: Physical Chemistry Seminar, WSU, December 1986.
18. *Hydrogen Trapping in Vacancies in Metals*: Colloquium, Physics Department, WSU, October 1987.
19. *Hydrogen Trapping in Lattice Vacancies in Metals*: Seminar, Department of Mechanical and Materials Engineering, WSU, February 1988.
20. *Nuclear Probe Studies of Defects in Metals*: Seminar, Idaho National Engineering Laboratory, Idaho Falls, June 1989.
21. *PAC: A Spectroscopy for Point Defects in Metals*: Seminar, Department of Physics, University of Central Florida,

- Orlando, September 1989.
22. *Novel Studies of Equilibrium Point Defects in Intermetallic Compounds:* Colloquium, Physics Department, WSU, January 1991.
  23. *PAC Studies of Equilibrium Defects in NiAl:* Seminar, Idaho National Engineering Laboratory, April 1991.
  24. *PAC studies of equilibrium point defects in NiAl and other high-temperature intermetallic compounds:* Seminar, Institute of Materials Research, Tohoku University, Sendai, Japan, August 1992.
  25. *Moessbauer spectroscopy:* Seminar, Materials Characterization Series, Institute of Materials and Advanced Processing, University of Idaho, November, 1994.
  26. *Possible explanation of the brittle-to-ductile transition temperature in NiAl,* Nuclear Solid-State Physics Group Seminar, University of Groningen, The Netherlands, September 1995.
  27. *PAC studies of intermetallic compounds at Groningen,* Nuclear Solid-State Physics Group Seminar, University of Groningen, The Netherlands, November 1995.
  28. *Defects in intermetallic compounds studied by PAC,* Research Seminar, PAC Group, University of Konstanz, Germany, February 1996.
  29. *Point defects in intermetallic compounds studied by PAC,* Seminar, Department of Physics, Uppsala University, Sweden, April 29, 1996.
  30. *Two different regimes for equilibrium point-defects in B2 intermetallic compounds,* Sonderforschungsbereich Colloquium, Department of Physics, University of Konstanz, Germany, May 10, 1996.
  31. *PAC studies of equilibrium defects in intermetallic compounds,* Seminar, Materials Center, Hahn-Meitner Institute, Berlin, Germany, May 27, 1996.
  32. *PAC studies of equilibrium defects in intermetallic compounds* Colloquium, Physics Department, University of Leipzig, Germany, May 29, 1996.
  33. *Equilibrium defects in B2 intermetallic compounds,* Sonderforschungsbereich Colloquium, Department of Physics, University of the Saarlandes, Germany, July 24, 1996.
  34. *Point defects in intermetallic compounds (part I),* Colloquium, Department of Physics, Washington State University, September 24, 1996.
  35. *Point defects in intermetallic compounds (part II): low-temperature mechanical properties of NiAl,* Joint Colloquium, Dept. of Physics and Program in Materials Science, Washington State University, January 14, 1997.
  36. *Studies of defects in structural intermetallics at ISAC,* WEEIS Planning Workshop for new isotope implantation facility, TRIUMF, April 27, 1997.
  37. *Point defects at high temperature under the PAC microscope,* Joint colloquium, Dept. of Physics and Program in Materials Science, Washington State University, January 20, 1998.
  38. *PAC studies of point defects in intermetallic compounds,* Colloquium, Dept Physics, Brigham Young University, March 8, 2000.
  39. *Guest atoms in solids,* Colloquium, Dept Physics, Washington State University, October 2, 2001.
  40. *Materials science studied by nuclear methods,* Guest speaker in MSE 321, April 25, 2002, David Field, instructor.
  41. *Guest atoms in solids,* Seminar, Technical Physics, University of the Saarlandes, Saarbrücken, Germany, October 10, 2002.
  42. *Guest atoms in solids,* Sonderseminar, Fachbereich Physik, Universität Paderborn, Germany, October 17, 2002.
  43. *Guest atoms in solids,* Seminar, Fakultät für Physik und Geowissenschaften, University of Leipzig, Germany, October 23, 2002.
  44. *Guest atoms in solids,* Seminar, II. Institute of Physics, University of Göttingen, Germany, October 28, 2002.
  45. *Guest atoms in solids,* Seminar, Institut für Festkörperphysik, Technische Universität Wien, Austria, Nov. 6, 2002.
  46. *Guest atoms in solids,* Seminar, Institut für Materialphysik, Universität Wien, Austria, November 7, 2002.
  47. *Atoms in motion: a new method for studying diffusion in solids,* Colloquium, Physics, Washington State University,

January 27, 2004.

48. *Atoms in motion: studying diffusion in solids using nuclear quadrupole relaxation*, Colloquium, Physics, University of Idaho, April 5, 2004.
49. *PAC probes used as diffusion tracers*, Seminar, Sonderforschungsbereich 458, Institut für Materialphysik, Westfälische Wilhelms-Universität Münster, August 20, 2004.
50. *Diffusion by a new route*, Mechanical and Materials Engineering Symposium Series-1, WSU, September 9, 2004.
51. *The atomic slide puzzle*, Freshman Seminar (Physics 188), WSU, September 23, 2004.
52. *Solids studied by nuclear probe methods at WSU*, Graduate Seminar in Physics (Physics 501), WSU, Dec. 2, 2004.
53. *Brownian Motion*, seminar for visiting high school students from Spokane in MESA Program in connection with World Year of Physics activities of Dept. of Physics and Astronomy, WSU, February 8, 2005.
54. *Random walks in 3d mazes*, Physics and Astronomy Colloquium, WSU, April 12, 2005.
55. *Brownian Motion*, seminar for visiting high school students from Cheney in MESA Program in connection with World Year of Physics activities of Dept. of Physics and Astronomy, WSU, April 20, 2005.
56. *Random walks in 3d mazes*, Physics Colloquium, University of Central Florida, Orlando, June 15, 2005.
57. *The atomic slide puzzle: a model for diffusion in solids*, Freshman Seminar I (Physics 188), WSU, October 6, 2005.
58. *Atom-scale studies of materials using hyperfine interactions*, Seminar in Physical Chemistry and Materials Science (Materials Science 593), WSU, November 4, 2005.
59. *The atomic structure of solids studied using PAC*, Graduate Seminar in Physics (Physics 501), WSU, Dec. 8, 2005.
60. *Secret lives of solutes*, Physics and Astronomy Colloquium, WSU, February 14, 2006.
61. *Atom movement or diffusion in solids: the “drunken sailor’s walk” and “atomic slide puzzle”*, Undergraduate Seminar I (Physics 188), WSU, October 19, 2006.
62. *Atoms in solids*, Graduate Seminar in Physics (Physics 501), WSU, December 8, 2006.
63. *Atoms in solids*, Research Experience for Undergraduates Summer School: “Extreme Matter”, WSU, June 12, 2007.
64. *Perturbed angular correlation spectroscopy studies of solutes in compounds: Lattice locations, electric field gradients, site enthalpies and vibrational entropies*, Physics and Astronomy Colloquium, WSU, October 2, 2007.
65. *Defects and diffusion in solids: or the drunken sailor’s walk and the atomic slide puzzle*, Undergraduate Seminar I (Physics 188), WSU, November 15, 2007. A PDF version is at <http://www.wsu.edu/~collins/Drunken-Sailors-Walk-2007.pdf>.
66. *Labyrinths for atom movement: diffusion in solids*, Graduate Seminar in Physics (Physics 501), WSU, November 29, 2007.
67. *Perturbed angular correlation spectroscopy studies of solutes in compounds: Lattice locations, electric field gradients, site enthalpies and vibrational entropies*, Seminar, Department of Physics and Mechanics of Materials, Institute of Physics, University of São Paulo, December 7, 2007. Guest of Prof. Dra. Helena Petrilli.
68. *Measuring differences of site enthalpies and vibrational entropies of solute atoms in intermetallic compounds*, Seminar, Dynamics of Condensed Systems, Institute of Materials Physics, University of Vienna, March 28, 2008. Guest of Profs. Wolfgang Pfeiler and Gero Vogl.
69. *Atoms in solids*, Seminar, Research Experience for Undergraduates Summer School: “Extreme Matter”, WSU, June 17, 2008.
70. *Atoms on the move: diffusion in solids*, Undergraduate Seminar I (Physics 188), WSU, September 4, 2008.
71. *Atom movement in solids*, Graduate Seminar in Physics (Physics 501), WSU, September 25, 2008.
72. *Identifying diffusion mechanisms in compounds using PAC*, Sonderseminar, Technical Physics, University of the Saarlandes, Saarbrücken, Nov. 6, 2008; guest of Prof. Dr. Thomas Wichert.
73. *Identifying diffusion mechanisms in compounds using PAC*, Seminar, Nuclear Festkörperphysik Group, University of Leipzig, Nov. 12, 2008; guest of Prof. Dr. Tilman Butz. .
74. *Identifying diffusion mechanisms in compounds using PAC*, Seminar, Institute of Physical Chemistry, University of

- Hannover, Nov. 13, 2008; guest of Prof. Dr. Paul Heitjans.
75. *Identifying diffusion mechanisms in compounds using PAC*, Seminar, Institute for Materials Physics, University of Münster, Nov. 14, 2008; guest of Prof. Dr. Nicolaas Stolwijk.
  76. *Identifying diffusion mechanisms in compounds using PAC*, Seminar, Helmholtz Zentrum Berlin für Materialien und Energie (HZB) (formerly Hahn Meitner Institut), Nov. 20, 2008; guest of Drs. Rainer Sielemann and Heinz-Eckhard Mahnke.
  77. *Diffusion of tracer atoms on Al-sites in tetragonal Al<sub>4</sub>Ba phases*, Academic Showcase, WSU, March 27, 2009. with Randal Newhouse, WSU, and Matthew O. Zacate, Northern Kentucky University. (poster paper).
  78. *Agitated atoms in solids: the atomic slide puzzle*, Seminar, Research Experience for Undergraduates Summer School: "Extreme Matter", WSU, July 7, 2009.
  79. *New insight into diffusion mechanisms in compounds*, Physics Colloquium, WSU, September 8, 2009.
  80. *The atomic step dance: diffusion in solids*, Undergraduate Seminar I (Physics 188), WSU, October 8, 2009.
  81. *Site preferences of impurity atoms in compounds*, Graduate Seminar in Physics (Physics 501), WSU, Oct. 22, 2009.
  82. *Site preferences of solute atoms in compounds*, Colloquium, Department of Physics, University of Idaho, November 16, 2009.
  83. *Diffusion in solids: the atomic slide puzzle*, Graduate Seminar in Physics (Physics 501), WSU, October 7, 2010.
  84. *Diffusion in solids: the atomic slide puzzle*, Undergraduate Seminar I (Physics 188), WSU, November 4, 2010.
  85. *Liquid gallium supercooled to 12K with formation of radioactive <sup>111</sup>In crystals*, Colloquium, Department of Physics, WSU, December 7, 2010.
  86. *All mixed up: Solubility of solutes having mole fractions of only 10 parts-per-billion*, Colloquium, Department of Physics, University of Idaho, February 28, 2011.
  87. *Diffusion in solids: the atomic slide puzzle*, Undergraduate Seminar I (Physics 188), WSU, November 17, 2011.
  88. *Atom scale studies of diffusion in solids*, Graduate Seminar in Physics (Physics 501), WSU, December 8, 2011.
  89. *The solubility of indium in solid and liquid gallium*, Colloquium, Department of Physics and Astronomy, Washington State University, January 31, 2012.
  90. *Locations of impurity atoms studied with atom-scale sensitivity using hyperfine interactions methods*, Colloquium, Materials Science and Engineering Program, WSU, March 30, 2012.
  91. *Diffusion in solids: walks in three-dimensional mazes*, Graduate Seminar in Physics (Physics 501), WSU, November 29, 2012.
  92. *Where guest atoms go in compounds*, Undergraduate Seminar I (Physics 188), WSU, December 6, 2012.
  93. *Correlation between jump frequencies and site preferences of impurity atoms in intermetallic compounds*, Materials Science Program Colloquium, WSU, January 25, 2013.
  94. *Defects and defect interactions in niobium*, Accelerator Group Seminar, CEBAF, Jefferson Laboratory, Newport News, VA, March 28, 2013 (invited talk and consulting visit).
  95. *Crystal defects and atom movement in solids*, Combined Graduate Seminar in Physics (Phys 501) and Undergraduate Seminar I (Phys 188), WSU, October 10, 2013.
  96. *The correlation factor in impurity diffusion*, Colloquium, Department of Physics and Astronomy, Washington State University, April 8, 2014.
  97. *Site preference and motion of impurity atoms in solids studied with atom-scale resolution*, Combined Graduate Seminar in Physics (Phys 501) and Undergraduate Seminar I (Phys 188), WSU, October 16, 2014.
  98. *Novel studies of intermetallic compounds at the atomic level*, Seminar, Materials Science and Engineering Program, WSU, October 31, 2014. An announcement can be found at <https://drive.google.com/file/d/0ByHbrg4MKoASSGxSYzZBWIJZjA/view?usp=sharing>
  99. *Site preferences of solute atoms in intermetallic compounds studied using PAC*, Seminar, Institute of Material Physics, Westfälische Wilhelms-Universität, Münster, April 7, 2015.

100. *Atom movement in ordered alloys studied using PAC*, Seminar, Institute of Material Physics, Westfälische Wilhelms-Universität, Münster, April 14, 2015.
101. *Atom movement in ordered alloys studied using PAC*, Seminar, Zentrum für Festkörperchemie und Neue Materialien (ZFM), Leibniz Universität, Hannover, April 20, 2015.
102. *Atom movement in ordered alloys studied using PAC*, Seminar, Technical Physics Department, Universität des Saarlandes, May 7, 2015.
103. *Diffusion in compounds studied by nuclear hyperfine interaction methods*, Seminar, Department of Physics, Catholic University of Leeuven, May 19, 2015.
104. *Lattice locations of impurities in compounds studied by nuclear hyperfine interaction methods*, Seminar, Department of Materials Science, Ghent University, May 20, 2015.
105. *Site preference and motion of impurity atoms in solids studied with atom-scale resolution*, Undergraduate Physics Seminar I (Phys 188), WSU, October 1, 2015.
106. *Atom-scale studies of motion of atoms in solids and locations of impurity atoms in compounds*, Graduate Physics Seminar (Phys 501), WSU, October 8, 2015.
107. *Interactions between pairs of solute atoms in the intermetallic  $GdAl_2$* , Debashis Banerjee, Ryan Murray and Gary S. Collins, Academic Showcase, WSU, March 25, 2016, poster presentation by Gary S. Collins.
108. *Reversible trapping of solute atoms at grain boundaries in the intermetallic  $GdNi_2$* , Ryan Murray, Debashis Banerjee and Gary S. Collins, Academic Showcase, WSU, March 25, 2016, poster presentation by Ryan Murray.
109. *Atom-scale studies of motion of atoms in solids and locations of impurity atoms in compounds*, Undergraduate Seminar 188, November 17, 2016.
110. *Atom-scale studies of motion of atoms in solids and locations of impurity atoms in compounds*, Graduate Seminar 501, December 1, 2016.
111. *Atom-scale studies of interactions between solute atoms in solids*, Colloquium, Dept of Physics and Astronomy, WSU, April 4, 2017.
112. *Atom-scale studies of motion of atoms in solids and locations of impurity atoms in compounds*, Graduate Seminar 501, September 21, 2017.
113. *Atom-scale studies of motion of atoms in solids and locations of impurity atoms in compounds*, Undergraduate Seminar, September 28, 2017.
114. *Partition of solute atoms among sublattices in a compound*, Colloquium, Dept of Physics and Astronomy, WSU, September 27, 2018.
115. *Diffusion in compounds studied using nuclear quadrupole interactions*, Graduate Seminar 501, November 6, 2018.
116. *Jump-frequencies of impurity atoms in compounds*, Materials Science Program Seminar, WSU, December 7, 2018.

## BIOGRAPHICAL LISTINGS

American Men and Women of Science (R. R. Bowker, since 1982.; Gale Group, since 2003)

Who's Who in Science and Engineering (Marquis, since 1992..)

Who's Who in the West (Marquis, since 1997..)

Who's Who in the World (Marquis, since 1999..)

## TEACHING

### OVERVIEW OF COURSES TAUGHT

#### Graduate Level

Solid State Physics (Ashcroft and Mermin, Kittel)  
 Diffusion and Defects in Solids (Shewmon)  
 Electromagnetic Theory (Jackson)  
 Quantum Physics Laboratories (Melissinos)  
 Thermal and Statistical Physics (Callen, Mattis)  
 Seminars in Solid-State and Condensed-Matter Physics:  
   Solid State Spectroscopy  
   Materials Physics  
   Point Defects in Solids (Agullo-Lopez, Catlow, Townsend)  
   Atom Movement in Solids (Philibert)  
   Nuclear Methods in Solids (Schatz and Weidinger)

#### Undergraduate Level

Introductory Physics  
 Modern Physics (Arya, Krane, Eisberg & Resnick, Harris)  
 Electricity and Magnetism (Griffiths)  
 Electronics Laboratories (Diefenderfer, Barnaal)  
 Quantum Physics Laboratories (Melissinos)  
 Honors Seminar in Particle Physics  
 Thermal Physics (Kittel & Kroemer, Gould & Tobochnik)

### INSTRUMENTATION IN SUPPORT OF TEACHING

1990-92    NSF grant PHY 89-51582, Instrumentation and Laboratory Improvement Program, *Development of a Quantum Physics Laboratory*. Equipment grant for advanced undergraduate physics laboratory course. (\$18,500 plus equal university matching, for 2.5 years, at Washington State University: [Principal Investigator](#)).

## COURSES TAUGHT

### A. RUTGERS COLLEGE, NEW BRUNSWICK, NEW JERSEY

Year	Course	Credit	Enroll
73-74	Electronics Lab for Physics Majors 287-288 (coadjutant instructor, taught 50%)	3/3	~15
74-75	Electronics Lab for Physics Majors 287-288 (coadjutant instructor, taught 50%)	3/3	~15
76-77	Introductory Physics 225-226 (Supervisor of laboratories, including 4 lab TA's)	3/3	~250

### B. CLARK UNIVERSITY, WORCESTER, MASSACHUSETTS

#### UNDERGRADUATE COURSES

Term	Course	Credit	Enroll
Fa 77	Quantum Physics 113	3	5
Sp 78	Nuclear Instrumentation Laboratory 129 (Melissinos)	3	5
Fa 78	Quantum Physics 113	3	13
Fa 78	Honors Seminar in Particle Physics 101 (taught jointly with Rob Goble)	3	7
Sp 79	Nuclear Instrumentation Laboratory 129	3	7
Fa 79	Electronics Laboratory 119	3	22
Sp 80	Nuclear Instrumentation Laboratory 129	3	4
Fa 80	Electronics Laboratory 119	3	23
Sp 81	Nuclear Spectroscopy Laboratory 129	3	3
Fa 81	Electronics Laboratory 119	3	25
Sp 83	Classical Physics 112	3	9
Fa 83	Quantum Physics 113	3	9
Sp 84	Classical Physics 112	3	15
Fa 84	Quantum Physics 113	3	4
Sp 85	Quantum Physics Laboratory 114	3	5

## GRADUATE COURSES

Term	Course	Credit	Enroll
Fa 77	Solid State Physics 310 (Kittel)	3	2
Sp 78	Nuclear Instrumentation Laboratory 219	3	4
Sp 79	Solid State Physics 310	3	6
Sp 80	Instrumentation Laboratory 229	3	1
Sp 81	Instrumentation Laboratory 229	3	5
Fa 82	Solid State Physics 310 (Ashcroft and Mermin)	3	3
Sp 83	Solid State Physics 310	3	1
Fa 83	Solid State Spectroscopy 317 (taught jointly with Chris Landee)	1	6
Sp 85	Quantum Physics Laboratory 214 (formerly 229)	3	3

## C. WASHINGTON STATE UNIVERSITY, PULLMAN, WASHINGTON

## UNDERGRADUATE COURSES

Term	Course	Credit	Enroll
Fa 85	Modern Physics 303 (Eisberg and Resnick)	3	18
Sp 86	Modern Physics 304 (Eisberg and Resnick)	3	10
Sp 86	Quantum Physics Laboratory (taught as Phys 499) (Melissinos)	3	1
	Physics 415 has been the primary advanced undergraduate laboratory course for physics majors since it was formally adopted in 1989. I developed the course from scratch starting in my first year at WSU and taught it continuously until 2002, with a break of one year while on sabbatical. It was originally colisted as Phys 515 and offered to graduate students until 1994. With generous support from the Department, College, and a National Science Foundation teaching laboratory instrumentation grant, the course has prospered and won praise from students who have taken it.		
Fa 86	Modern Physics 303	3	21
Sp 87	Modern Physics 304	3	13
Sp 87	Quantum Physics Laboratory (taught as 499) (Melissinos)	2	4
Fa 87	Modern Physics 303	3	15
Sp 88	Modern Physics 304	3	13
Sp 88	Quantum Physics Laboratory (taught as 499) (Melissinos)	2	6
Sp 89	Quantum Physics Laboratory 415 (Melissinos)	3	9
Sp 90	Quantum Physics Laboratory 415 (Melissinos)	3	5
Sp 91	Quantum Physics Laboratory 415 (Melissinos)	3	16
Sp 92	Quantum Physics Laboratory 415 (Melissinos)	3	8
Fa 92	Classical Physics for Scientists and Engineers 201	4	~200
Sp 93	Quantum Physics Laboratory 415 (Melissinos)	3	11
Fa 93	Classical Physics for Scientists and Engineers 201	4	~160
Sp 94	Quantum Physics Laboratory 415 (Melissinos)	3	6
Fa 94	General Physics 102	4	~75
Sp 94	Quantum Physics Laboratory 415 (Melissinos)	3	~6
Sp 95	Quantum Physics Laboratory 415 (Melissinos)	3	5
Fa 96	General Physics 101	4	~175
Sp 97	Quantum Physics Laboratory 415 (Melissinos)	3	1
Fa 97	General Physics 101	4	~86
Sp 98	Quantum Physics Laboratory 415 (Melissinos)	3	8
Fa 98	General Physics 101	4	~130
Sp 99	Quantum Physics Laboratory 415 (Melissinos)	3	4
Fa 99	Electricity and Magnetism I: physics 341 (Griffiths)	3	8
Sp 00	Electricity and Magnetism II: physics 342 (Griffiths)	3	~7
Sp 00	Quantum Physics Laboratory 415 (Melissinos)	3	~9
Fa 00	Electricity and Magnetism I: physics 341 (Griffiths)	3	12
Sp 01	Quantum Physics Laboratory 415 (Melissinos)	3	6
Fa 01	Electricity and Magnetism I: physics 341 (Griffiths)	3	10

Sp 02	Electricity and Magnetism II: physics 342 (Griffiths)	3	9
Sp 02	Quantum Physics Laboratory 415 (Melissinos)	3	12
Fa 03	Modern Physics II: physics 304 (Eisberg and Resnick)	3	12
Fa 04	Modern Physics II: physics 304 (Eisberg and Resnick)	3	14
Fa 05	Electronics: physics 410 (Barnaal) (laboratory course using Labview)	3	8
Fa 06	Electronics: physics 410 (Barnaal) (laboratory course using Labview)	3	8
Fa 07	Electronics: physics 410 (Barnaal) (laboratory course using Labview)	3	7
Fa 09	Modern Physics II: physics 304 (Eisberg and Resnick)	3	20
Fa 10	Modern Physics II: physics 304 (Randy Harris, Addison-Wesley, 2nd ed)	3	19
Fa 11	Modern Physics II: physics 304 (Randy Harris, Addison-Wesley, 2nd ed)	3	23
Fa 12	Modern Physics II: physics 304 (Randy Harris, Addison-Wesley, 2nd ed)	3	10
Fa 13	Physics for Scientists and Engineers: Physics 201 (Randall Knight: Pearson)	4	221
Su 14	General Physics I : Physics 101 (Knight, Jones. Field: Pearson)	4	16
Fa 14	Physics for Scientists and Engineers: Physics 201 (Randall Knight: Pearson)	4	124
Su 15	General Physics I : Physics 101 (Knight, Jones. Field: Pearson)	4	20
Fa 15	Physics for Scientists and Engineers: Physics 201 (Randall Knight: Pearson)	4	167
Sp 16	Thermal Physics 330 (Kittel and Kroemer)	3	11
Fa 16	Physics for Scientists and Engineers: Physics 201 (Randall Knight: Pearson)	4	180
Sp 17	Thermal Physics 330 (Gould and Tobochnik)	3	18
Fa 17	Physics for Scientists and Engineers: Physics 201 (Randall Knight: Pearson)	4	165
Sp 18	Thermal Physics 330 (Gould and Tobochnik)	3	19
Fa 18	Physics for Scientists and Engineers: Physics 201 (Randall Knight: Pearson)	4	192
Sp 19	Introduction to Solid-State Physics: Physics 463 (Steven Simon, Charles Kittel)	3	

## GRADUATE COURSES

Term	Course	Credit	Enroll
Sp 86	Quantum Physics Laboratory (taught as 600) (Melissinos)	2	3
Sp 87	Quantum Physics Laboratory (taught as 600)	2	3
Sp 88	Quantum Physics Laboratory (taught as 600)	2	1
Sp 88	Seminar in Condensed Matter Phys 593: <i>Solid-State Spectroscopy</i>	1	7
Fa 88	Advanced Topics 581: <i>Diffusion and Defects in Solids (Paul Shewmon)</i>	3	6
Sp 89	Seminar in Condensed Matter Physics 593: <i>Topics in Materials Physics and Chemistry</i>	1	4
Sp 90	Electromagnetic Theory 541 (Jackson)	3	15
Sp 90	Quantum Physics Laboratory 515 (Melissinos)	3	4
Fa 90	Electrodynamics 542 (Jackson)	3	11
Sp 91	Electromagnetic Theory 541	3	10
Fa 91	Electrodynamics 542	3	14
Sp 92	Quantum Physics Laboratory 515	3	3
Sp 93	Quantum Physics Laboratory 515	3	1
Sp 93	Seminar in Solid-State Physics 594: <i>Point Defects in Materials (Agullo-Lopez et al.)</i>	1	5
Fa 93	Seminar 590 (Physics colloquium)	1	33
Sp 94	Seminar 590 (Physics colloquium)	1	30
Sp 95	Seminar in Solid-State Physics 594: <i>Atom Movement in Solids (J. Philibert)</i>	1	5
Sp 95	Seminar 590 (Physics colloquium)	1	28
Sp 97	Seminar in Solid-State Physics 594: <i>Nuclear Methods in Solids (Schatz and Weidinger)</i> (Instructor-of-record; taught jointly with Kelvin Lynn)	1	5
Sp 99	Seminar 590 (Physics colloquium)	1	12
Sp 03	Thermal and Statistical Physics I: Physics 533 (Callen)	3	11
Sp 04	Thermal and Statistical Physics I: Physics 533 (Callen)	3	16
Fa 04	Seminar 590 (Physics colloquium)	1	21
Sp 05	Thermal and Statistical Physics I: Physics 533 (Callen and Mattis)	3	12
Sp 05	Seminar 590 (Physics Colloquium)	1	26
Sp 06	Thermal and Statistical Physics I: Physics 533 (Callen)	3	11
Sp 07	Thermal and Statistical Physics I: Physics 533 (Callen)	3	21
Sp 08	Thermal and Statistical Physics I: Physics 533 (Callen)	3	~18
Sp 09	Thermal and Statistical Physics I: Physics 533 (Callen)	3	~12
Sp 10	Thermal and Statistical Physics I: Physics 533 (Callen)	3	13
Sp 11	Thermal and Statistical Physics I: Physics 533 (Callen)	3	18



Sp 12	Thermal and Statistical Physics I: Physics 533 (Callen)	3	10
Sp 13	Thermal and Statistical Physics I: Physics 533 (Callen)	3	22
Sp 14	Thermal and Statistical Physics I: Physics 533 (Callen)	3	12
Sp 19	Thermal and Statistical Physics I: Physics 533 (Callen)	3	

### SPECIAL PROJECTS AND UNDERGRADUATE THESES (SINCE 2005)

Term	Student	Description	Course	Credit
Sp 05	Phillip Peterman:	Calculating Wigner-Seitz volumes of atoms in compounds	499	1
Fa 06	Morgan Emerson:	Imaging Wigner-Seitz cells	499	1
Sp 07	Morgan Emerson	Imaging Wigner-Seitz cells	499	1
Sp 07	Stephanie Lage	Local probes in $Al_{11}Ce_3$ phases	499	3
Sp 07	Ben Norman	Studies of intermetallics using $^{181}Hf$ probes	499	2
Fa 07	Ben Norman	Site preferences of solute atoms in mirror phases	490	1
Fa 10	Lee Aspitarte	Site preference of solutes in ternary $Al_4Ba$ phases: $BaNiSn_3$	499	2
Sp 11	Lee Aspitarte	Phase transformations in $In_3Zr$	490	1
Sp 12	Ben McDonald	Imaging Wigner-Seitz cells	499	1
Fa 14	Andrew Bleasdale	PAC studies of intermetallic compounds	499	1

### D. INTERNATIONAL PHD COMMITTEES

- 1994 External examiner, PhD thesis, Elias Sideras-Haddad, Physics, University of the Witwatersrand.  
 1994 External examiner, PhD defense, Mammo H. Yewondwossen, Physics, Dalhousie University.  
 1995 Faculty opponent, PhD defense, Michael Semple, Physics, Uppsala University.  
 1998 External examiner, PhD thesis, Eva Bezakova, Physics, Australian National University.

### E. PHD AND MS STUDENTS ADVISED SINCE 2011

- 2011 John P. Bevington, PhD, Materials Science, dissertation defended April 12, 2011.  
 2011 Xiangyu Yin, MS, Physics, thesis defended May 9, 2011.  
 2012 Qiaoming Wang, MS, Physics, thesis defended April 26, 2012.  
 2012 Randal Newhouse, PhD, Physics, dissertation defended May 16, 2012.  
 2013 Mark Kohan, MS student (summer research project).  
 2014-15 Sherry Orton, MS student (withdrew Fall 2015).  
 2015 Krystal Kasal, MS, Physics, defended June 10, 2015.  
 2017 Ryan Murray, PhD, Physics, defended April 2017.  
 2017- Windy Olsen, physics graduate student.  
 2018- Kyle Elsasser, physics graduate student.  
 2018- Bryant Ward, physics graduate student.  
 2018- Anesh Mukhopahdyay, physics graduate student.

### F. UNDERGRADUATE STUDENTS ADVISED SINCE 2014

- 2013 Ryan Harrison, MME major.  
 2014-16 Andrew Bleasdale, physics major, BS 2016.  
 2015-16 Elyse Waham, physics major, BS 2017.  
 2017 Zachery Bartlett, physics major.

### G. GRADUATE COMMITTEE SERVICE

(NOT CHAIRED BY ME; ABOUT 10-20 PRIOR TO 2003 NOT LISTED. I EARLIER, UP TO 2000, I WAS ALSO GRADUATE SCHOOL REPRESENTATIVE AT ABOUT 12 PRELIMINARY AND FINAL EXAMS IN OTHER DEPARTMENTS. A FACULTY FUNCTION THAT NO LONGER EXISTS.)

- 1998 Bey-Bey Li, PhD, defended May 1998, Science Education, WSU (Advisor: Verna Adams)
- 2003 Kakali Tripathi, MS, defended May 2003, Physics, WSU (Advisor: Mark Kuzyk)
- 2005 Pankaj B. Trivedi, PhD, defended May 2005, Materials and Mechanical Engineering, WSU (Advisor: David Field)
- 2006 Xiaorong Li, MS, defended May 2006, Physics, WSU (Advisor: Mark Kuzyk)
- 2008 Christopher Dudley, PhD, defended April 8, 2008, Physics, WSU (Advisor: Philip Marston)
- 2009 Ashish Mishra, MS, defended August 5, 2009, Physics, WSU (Advisor: Yi Gu)
- 2009 Leiming Wang, PhD, defended December 10, 2009, Physics, WSU (Advisor: Lai-Sheng Wang)
- 2010 Denys Solodovnikov, PhD proposal defended Dec. 2009, Mat Sci & Eng Program, WSU (Advisor: Kelvin Lynn)
- 2010 Sharon John, PhD defended March 6, 2010, Physics, WSU (Advisor: Tom Dickinson).
- 2010 Amlan Datta, MS thesis defended June 30, 2010, Physics, WSU (Advisor: Kelvin Lynn)
- 2011 Andrey Perevelov, MS, defended April 12, 2011 (Advisor: Matt CcCluskey)
- 2011 Drew Haven, MS, defended June 30, 2011 (Advisor: Kelvin Lynn)
- 2011 Amlan Datta, PhD preliminary exam, August 4, 2011, Materials Science Program (Advisor: Kelvin Lynn)
- 2012 Samaneh Tabatabaei, MS defended April 26, 2012, Physics, WSU (Advisor: Matt McCluskey)
- 2012 Samuel Teklemichael, PhD Physics, July 13, 2012 (Advisor: Matt McCluskey)
- 2012 Jharana Dahl, MS, PhD, Physics, defended November 14 (Advisor: Amit Bandyopadhyay)
- 2012 Samaneh Tabatabaei, PhD Materials Science, August 9, 2012 (Advisor: Matt McCluskey)
- 2012 Christopher Varney, PhD, Physics, defended December 4, 2012 (Advisor: Farida Selim)
- 2013 Fatema Abobaker, non-thesis MS defense, January 15, 2013, Physics Education (Adv: Kimberley Vincent, Math)
- 2013 Drew Haven, PhD, Materials Science Program, defended April 9, 2013 (Advisor: Kelvin Lynn)
- 2013 Amlan Datta, PhD, Physics, defended April 11, 2013 (Advisor: Kelvin Lynn)
- 2013 Tong Wan, non-thesis MS defense, June 18, 2013, Physics (Advisor: Michael Allen)
- 2013 David Mackay, Materials Science, prelim research proposal Nov. 19, 2013 (Advisor: Grant Norton)
- 2013 Kasey Lund, MS Physics defended Oct. 2, 2013 (Advisor: Kelvin Lynn)
- 2013 Peter Dickens, MS Physics (Advisor: Kelvin Lynn)
- 2013 Iman Salahenia, PhD, defended March 20, 2013, Materials Science Program (Advisor: David Bahr, Purdue U.)
- 2013 Ranga Dias, PhD, Physics, defended July 3, 2013 (Advisor: Choong-Shik Yoo)
- 2013 Sachin Bhaladhare, PhD, Materials Science Program, defended June 19, 2013 (Advisor: Kelvin Lynn)
- 2014 Gustav Borstad, PhD, Physics, defended April 15, 2014 (Advisor: Choong-Shik Yoo)
- 2014 Prabodh Dhakal, PhD, Materials Science, passed prelim exam, Nov. 13, 2013 (Advisor: Mark Kuzyk)
- 2014 Veronica Ruiz, MS, Physics (Advisor: Michael Allen)
- 2014 Stephen Cornthwaite, MS, Physics, defended October 30, 2014 (Advisor: Fred Gittes)
- 2014 Peter Dickens, PhD, Materials Science, proposal defended August 23, 2014 (Advisor: Kelvin Lynn)
- 2015 Nathan Rasmussen, Physics (Advisor: Mark Kuzyk)
- 2015 Prabodh Dhakal, PhD, Materials Science, defended January 7, 2015 (Advisor: Mark Kuzyk)
- 2015 Hamdah Alanazi, MS, Physics, defended June 24, 2015 (Advisor: Mark Kuzyk)
- 2015 Kasey Lund, PhD, Physics, defended June 30, 2015 (Advisor: Kelvin Lynn)
- 2016 David Mackay, MS, Materials Science, defended May 3, 2016 (Advisor: Grant Norton)
- 2016 Peter Dickens, PhD, Materials Science, defended July 27, 2016 (Advisor: Kelvin Lynn)
- 2016 Violet Poole, PhD, Physics, defended July 27, 2016 (Advisor: Matthew McCluskey)
- 2016 Qiaoming Wang, PhD, Physics, defended August 19, 2016 (Advisor: Yi Gu)
- 2016 Amin Khamehchi, PhD, Fall 2016 (Advisor: Kelvin Lynn)
- 2018 Shengwen Zhou, PhD, defended May 30, 2018 (Advisor: Yi Gu)
- 2018 Chris Pansegrau, Preliminary Oral Exam for PhD, November 14, 2018 (Advisor: Matt McCluskey)

## UNIVERSITY SERVICE

### A. CLARK UNIVERSITY, WORCESTER, MA

Advisor to Physics Majors	Sep 83 - May 85
Physics Colloquium Organizer	Sep 82 - May 83
Physics Library Supervisor	Sep 81 - May 83
University Radiation Safety Committee	Sep 83 - May 85

### B. WASHINGTON STATE UNIVERSITY, PULLMAN, WA

#### FACULTY STATUS COMMITTEE (adjudicates disputes among members of the faculty)

Elected by faculty of the university	Aug 98 – Aug 01
Nominated to run again for 2007-10; not elected	

#### FACULTY SENATE UNIVERSITY COMMITTEES

Academic Policy Review Committee -- Subcommittee to Review Program in Statistics	Chair- Oct 01 - Apr 02
Committee on Committees	Feb 93 - Aug 96
Faculty Affairs Committee	Aug 92 - Aug 95
	Chair- Aug 93 - Aug 94
	Chair- Aug 94 - Aug 95
	Aug 01 - Aug 02
	Sep 06 - Aug 10
Nominee for Chair-Elect of the Senate, losing by close 19-24 vote. Position statement at <a href="http://www.wsu.edu/~collins/Collins-chair-elect.pdf">http://www.wsu.edu/~collins/Collins-chair-elect.pdf</a> .	Spring 2012
Research and Arts Committee	Aug 88 - Aug 91
	Chair- May 89 - Aug 90
Research and Arts Grant-in-Aid Evaluation Subcommittees	Chair- Nov 88 - Mar 89
	Nov 89 - Mar 90
	Nov 90 – Mar 91
Senate ad hoc Committee on Faculty Salaries (I was a principal author and editor of the <i>Report on the Status of Faculty Salaries at WSU 2007</i> , presented to the Faculty Senate in Nov. 2007; see <a href="http://www.wsu.edu/~collins/facultysalaryreport">http://www.wsu.edu/~collins/facultysalaryreport</a> ).	Co-chair-Feb 07-Nov 07
Senate ad hoc Committee on Future of the Reactor	Aug 87 – May 88
Senate ad hoc Committee on Misconduct in Research	Feb 89 – May 89
Senate ad hoc Committee to Investigate Meeting Minutes controversy (A controversy developed over the rules for succession of Senate Chairs in Fall 2011. I was appointed member of an investigating committee by vote of the Senate. I authored a chronology of events between August and October 2011 made available to senators via the Senate's maillist; see <a href="https://www.wsu.edu/~collins/Chronology.pdf">https://www.wsu.edu/~collins/Chronology.pdf</a> , and a document archive <a href="http://www.wsu.edu/~collins/Chair_Succession_Documents.zip">http://www.wsu.edu/~collins/Chair_Succession_Documents.zip</a> . The evidence leading me and two other senators to conclude that minutes had been improperly modified is described in memo to senators at <a href="http://public.wsu.edu/~collins/minutes_not_original.pdf">http://public.wsu.edu/~collins/minutes_not_original.pdf</a> .)	Oct 11 – Jan 12
Senate Steering Committee, <i>ex officio</i> as chair of Research and Art Committee	May 89 – Aug 90
Senate Steering Committee, <i>ex officio</i> as chair of Faculty Affairs Committee	Aug 93 – Aug 94
(two years)	Aug 94 - Aug 95

**PRESIDENTIAL UNIVERSITY COMMITTEES**

Insurance, Annuities and Retirement Committee	Aug 94 - Aug 98
	Chair- Aug 96 - Aug 97
President's Faculty Excellence Award Selection Comm for Research	Oct 91 - Mar 92
Reactor Safeguards Committee	Aug 86 - May 89
	Chair- May 88 - May 89
	Aug 00 - May 01
Review of Radiation Safety Committee (with Boon Chew)	May 06 - May 07
Subcommittee of Academic Steering Committee for Computing & Telecommunication for VAX's	Aug 87 - May 90
	Chair- Aug 87 - May 89

**OTHER UNIVERSITY COMMITTEE SERVICE**

Nomination Committee for Faculty Senate Officers	Mar 94
Radiation Safety Committee Audit (with Boon Chew)	Feb 07 - Jul 07
Senate Interviewer of Provost candidates	Mar 91 - Apr 91
Senate Representative: Assessment of Information Tech. by GFA Consulting	Aug 93

**COLLEGE OF SCIENCES**

COS Undergraduate Research Poster Competition Judge	April 08
Faculty Council (elected by physical sciences faculty)	Oct 01 - disbanded
Research Mini-grant Evaluation Committee	Feb 93 - May 95
Technical Rater in Scientific Programmer I Search	Dec 87
Technical Services Advisory Committee	May 97 - May 00
VAX User's Committee	Aug 86 - May 87
Résumé Writing Workshops for science students	March 03, 04, 05, 06

**DEPARTMENT OF PHYSICS**

Learning Assessment Committee (designing procedures)	Chair- Feb 05 - Oct 05
Colloquium Coordinator (Physics 590)	Aug 93 - May 94
	Jan 95 - May 95
	Jan 99 - May 99
	Aug 04 - May 05
Computer Committee	Aug 85 - May 87
Faculty Search: Astrophysics	Aug 07 - May 08
Faculty Search: Experimental Physics	May 06 - May 07
Faculty Search: High-Pressure	Aug 88 - May 89
Faculty Search: High-Pressure	Aug 89 - May 90
Faculty Search: Instructor	Chair- Aug 00 - Apr 01
Faculty Search: Physics Education	May 97 - May 98
Faculty Search: Surface Physics	Aug 88 - May 89
Faculty Search: Theory	Aug 94 - May 95
Graduate Studies Committee	Aug 89 - Feb 90
	Aug 00 - May 12
Graduate Studies Recruitment Committee	Chair- Aug 12 - now
Liaison to Science Library	Aug 98 - May 01
Local organizing committee: American Physical Society, Northwest Section Meeting, Pullman/Moscow, May 21-22, 2004. I had major responsibility coordinating activities with the Conference Office at the University of Idaho, program chair Larry Hall, and APS Northwest Executive Committee. Co-chaired with Professor Bernhard Stumpf, University of Idaho. Photos are available at	Co-chair- Aug 03 - Jun 04

Peace Corps Recruiter Erin Carlson visited from Seattle; I hosted visit with graduate students	Sep 07
Senator from Physics (University Faculty Senate)	Aug 88 - Aug 94 Aug 06 - Aug 09 Aug 09 - Aug 12
Space Committee	Aug 01 - ???
Staff Search: Lecture/Demonstrator Laboratory/Supervisor	Chair- May 90 - Mar 91
Staff Search: Director of undergraduate teaching laboratories	Chair- Aug 98 - May 99
Undergraduate Studies Committee	Aug 85 - Sep 89 May 90 - Aug 92 Chair- May 90 - Aug 92

### OTHER UNIVERSITY SERVICE

Committee to Review Leon J. Radziemski, Dean of Sciences (1995-2000)	Nov 99 - May 00
Education Abroad Networking Breakfasts	Feb 05, Jan 06
Faculty Evaluation Committee (Teaching, MME, College of Engineering)	Nov 91, Nov 92
Faculty Phonathon (student recruitment)	Feb 92
Materials Science Program - Colloquium Committee	Aug 97 - May 98
Materials Science Program - Graduate Studies Committee	Aug 92 - May 93 May 98 - Dec 98 Aug 11 - now
Materials Science Research Planning Workshop	Nov 86
Nuclear Engineering Option in MME/WSU (ad hoc committee chaired by Russell V. Westphal)	Nov 07 - May 08
Nuclear Radiation Center Director Searches	Sep 89 Jan - May 91
Regents Scholars Program: rating applications, attending breakfasts, etc.	Fall 03, 05, 06, 07
Research Excellence Award Nominating Committee, Engineering	Feb 92
Washington Technology Center: Associate Director Search	Aug 87 - May 88
Wiley Graduate Research Exposition; Judge	Nov 10

### UNIVERSITY RELATED SERVICE

American Association of University Professors (AAUP), WSU Chapter, Executive Committee, Member at Large	Fall 2009- now
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## SUBSEQUENT POSITIONS OF FORMER ASSOCIATES

### POSTDOCTORAL AND PH.D. STUDENTS

Carl Allard (Ph.D. 1985, Clark University): Staff Medical Physicist, positron emission tomography, Veterans Administration Hospital, West Roxbury, MA 1986- (deceased ca. 1988).

Ataur Rahman Chowdhury (Ph.D. 1985, Clark University): Associate Professor of Physics (with tenure), University of Alaska, Fairbanks.

Reinhardt B. Schuhmann (Ph.D. 1988, Clark University): Managing Editor, Physical Review Letters (2001- ).

Steven L. Shropshire (Ph.D. 1991, Washington State University): Professor of Physics (with tenure), Idaho State University, Pocatello.

Jiawen (Jay) Fan (Ph.D. 1992, Washington State University): Technical Director, radioisotopes products, North American Scientific, Incorporated, Los Angeles. Opened branch office in Beijing, China, about 2005-7.

Praveen Sinha (Ph.D. 1995, Washington State University): NIH Postdoctoral Research Associate, Department of Radiation Oncology, University Hospital, University of Wisconsin, Madison to 1997; Scientist developing radiation oncology systems, ADAC Labs, Madison, Wisconsin (1998-2000); Entrepreneur and senior management in a variety of companies, including UltraVisual Medical Systems (web-based radiology computing, 2000-03); Thompson Investment Management (2004-); Novashield, Inc (2006-), and Healthmyne (2014-).

Bin Bai (Ph.D., 1997, Washington State University): Senior Technical Member, Micron Computers, Boise, Idaho (1997- ), Located in Micron/Seoul in 2005-6. Established branch offices for Micron in Xi'an, China, and South Korea, 2007- . Engineering and Technical Executive, Micron (2018).

Shing-Jen (Luke) Peng (Ph.D., 1998, Washington State University); Postdoctoral Associate, Physics, Washington State University (1998-99). Postdoctoral Associate, Gintzon Laboratory, Applied Physics, Stanford University (1999-2000). Research Scientist, Superconductor Technologies (earlier, Conductus), maker of high- $T_c$  devices (2000-06). Principal Process Engineer, PerkinElmer Medical Imaging (now Varex Imaging), Santa Clara (2006- ).

Matthew O. Zacate (Ph.D., Oregon State University, 1997); postdoc with Robin Grimes, Imperial College, 1997-99; postdoc at WSU, 1999-2003; Research Assistant Professor, WSU, 2003-2004; Associate Professor (with tenure), Department of Geology and Physics, Northern Kentucky University, 2004-. Adjunct Professor, WSU since Oct. 2008.

Farida Selim (Ph.D., Alexandria University); doctoral research at Lawrence Berkeley Laboratory sponsored by Harvard. Postdoctoral research and teaching at Idaho State University. Postdoctoral research at WSU split between research groups of Kelvin Lynn and myself, 2005-7. Instructor, WSU, 2007-9; Research Assistant Professor, Physics, WSU, 2009-13. We directed an NSF grant together. Currently Assistant Professor (tenure-track), Bowling Green Univ., Ohio, 2013-.

John P. Bevington (Ph.D., 2011, Washington State University); Senior Design Engineer, Pentair Flow Technologies (2013-).

Randal Newhouse (Ph.D., 2012, Washington State University); Assistant Professor of Physics, Sterling College, Sterling, Kansas (2013-).

Ryan Murray (Ph.D., 2017, Washington State University). Data Scientist, Allstate Insurance.

Debashis Banerjee (Ph.D., 2015, Homi Bhabha National Institute); Scientific Officer (permanent position), Bhabha Atomic Research Center (BARC), Kolkata, India.

### MASTERS, UNDERGRADUATE AND HIGH SCHOOL PARTICIPANTS

John Ochab (M.S. 1980, Clark University): PhD, Physics, University of Maine, Orono; Staff Scientist, Raytheon Corp., Boston, ~1989.

Samuel W. Porter (B.A., 1980, Clark University).

- Gil P. Stern (B.A., 1981, Clark University); entered graduate study at Johns Hopkins University.
- Hwa-Jae Jang (M.S. 1988, Washington State University): PhD candidate, Physics, SUNY Buffalo, 1988-
- Gregory McGhee (M.S. 1989, Washington State University): Senior Computer Scientist, Computer Sciences Corporation, Dahlgren, VA (Aegis guidance system) 1989-2006.
- Khushairi Zainun (M.S. 1989, Washington State University): returned to Malaysia, 1989.
- Andrew Vaught (B.S., 1989, Washington State University), Ph.D. in physics, Arizona State University.
- Phillip Himmer (B.S., 1989, Washington State University); continued in graduate study at Montana State University.
- Stacy Irwin (B.S., 1989, Washington State University).
- Steven Parry (M.S. 1990, Washington State University): Programmer, Nuclear Physics Group, Colorado State Univ., 1990-.
- Gil-Hong Kim (M.S. 1990, Washington State University): returned to Korea, 1990.
- Kirk Burris (B.S., 1991, Washington State University).
- John C. Sy (M.S., 1992, Washington State University): Instructor of Physics, Ateneo de Manila University, Manila, The Philippines, 1992-94. Computer scientist in Toronto and systems administrator in New Jersey (ca 1995).
- Bruce Meeves (M.S., 1993, Washington State University): Instructor in Physics, Colorado School of Mines from ~2000.
- Mingzhong Wei (M.S., 1998, Washington State University): Graduate student in computer science at WSU starting 1998.
- Andrew Janssen (B.S.?, ca 1998, Washington State University).
- Matthew Petersen (B.S., 2000, chemistry, U. Idaho). Entered graduate study in chemistry at the University of Utah in ~2000; Ph.D. candidate in 2004, PhD recipient later.
- Harmen Thys Nieuwenhuis (M.S. 1998, University of Groningen): Recipient of MBA degree from Oxford University about 2002. In business in The Netherlands and Singapore.
- Bonner Charles Walsh (B.S., 2001, physics, WSU): graduated from Southern Methodist University Dedman School of Law in about 2006. Employed with U.S. Citizenship and Immigration Services from about 2006.
- Denys Solodovnikov (graduate participant 2001-2); Ph.D. student in materials science WSU with Kelvin Lynn since ~2003.
- Slade Jokela (B.S., 2001, physics, WSU): Ph.D. Materials Science Program, WSU (2007, with Matt McCluskey). Postdoctoral associate, Department of Physics, University of Georgia (2007-8); Postdoctoral associate with Matt McCluskey at WSU (2008-). Materials scientist at Argonne National Laboratory, 2013.
- Aur lie Favrot (Diploma in Materials Engineering, ~2004, Institute des Sciences Appliqu es (INSA), Rennes, France)
- Li Kang (M.S., 2004, Washington State University): Returned to China to seek employment.
- Jipeng Wang (M.S., 2004, Washington State University): Graduate student in electrical engineering at Arizona State University starting Fall 2004.
- Egbert Rein Nieuwenhuis (M.S., Spring 2005, University of Groningen). Returned to the Netherlands and completed studies for an MS degree in physics. Now in business in Amsterdam.
- Lai Wang (M.S., May 2005, Washington State University): Graduate student in physics at George Washington University since Fall 2005.
- Kyle Slinker (Pullman High School, June 2006). BS, Physics, University of Washington, 2011; PhD, Astronomy, University of North Carolina, ca 2016.
- Xiao Wang (M.S., May 2006, Washington State University). PhD, Biophysics, Rochester, 2013. Model Risk Analyst Intern, Federal Home Loan Bank of Seattle since 2014.
- Morgan Emerson (B.S., May 2007, Washington State University). Graduate student in physics at Oregon State University starting Fall 2007; expected to receive MS degree in Spring 2009.
- Phillip Peterman (B.S. in physics, Dec 2006, Washington State University). PhD, Physics, Pennsylvania State U., May 2014.
- Stephanie Lage (B.S. in physics and B.S. in math, May 2007, Washington State University). Graduate study in applied math at the University of Colorado in Fall 2007. High-school math teacher since 2013.
- Arriety Lowell (M.S., physics, May 2007, Washington State University.) College teaching in Wisconsin starting Fall 2007.

- Ashley Dorwart (REU participant, summer 2007) Graduated with degrees in Spanish and Physics from Nebraska Wesleyan University, May 2009. Pursuing graduate study in atmospheric science, 2013, and law later on.
- Ben Norman (B.S. in physics, Dec 2007, honors thesis defended Oct 2007, Washington State University). PhD, University of Michigan, ca 2014.
- Xia (Sean) Jiang (M.S. in physics, May 2008). Graduate study in medical physics at the University of Chicago started Fall 2008. PhD June 2013.
- Justin Ahn (Pullman High School, June 2008). Northwestern University Fall 2008, graduate BS Business, May 2012.
- Megan Lockwood Harberts (REU participant, summer 2008). Physics PhD graduate of Ohio State University in 2015.
- Samantha Cawthorne (REU participant, summer 2009). BS graduate of Clemson University, May 2010; was to intern at NIST starting summer 2010 but tragically died in an accident days after graduation in May 2010.
- Prastuti Singh (Pullman High School, June 2010). Physics BS, California Institute of Technology, May 2014. Also Undergraduate Research Fellow at UC Berkeley in 2013. Currently graduate student in Applied Physics, Stanford.
- Justine Minish (REU participant, summer 2010). Graduated in May 2012 from Alma College, Alma, Michigan, attended graduate school in health science at Oakland University.
- Xiangyu Yin (MS in Physics, August 2011). Continued PhD physics research at WSU in group of Doerte Blume. Postdoctoral associates at Ohio State University and in Australia.
- Lee Aspitate (REU, summer 2011, BS Physics, August 2011). PhD, physics, Oregon State University, ca. 2016.
- Qiaoming Wang (MS Physics, May 2012). Continued in PhD and postdoctoral physics research at WSU in group of Yi Gu; PhD 2016. Currently postdoctoral associate at Southern University of Science and Technology, Shenzhen, Guangzhou.
- Krystal Kasal (MS in Physics, June 2015). Postdoctoral trainee on a fellowship in the National Nuclear Safety Administration, Research Scientist, Washington University, St. Louis.
- Elyse Waham (BS in Physics, May 2016). Sales Manager, Fluke Electronics, Everett, WA.
- Andrew Bleasdale (BS in Physics, May 2017). Schweitzer Engineering Laboratory, Pullman, WA.

### AWARDS AND PRESENTATIONS BY STUDENTS (since 2007)

1. *Site preference of indium solutes in  $Al_3Ti$  and  $Al_3Zr$  phases*, John P. Bevington, Farida Selim and Gary S. Collins; Academic Showcase, WSU, March 23, 2007 (poster).
2. *Diffusive motion of tracer atoms in  $Al_{11}R_3$  ( $R= La, Ce, Pr$ ) phases*, Stephanie Lage and Gary S. Collins, College of Sciences Undergraduate Research Poster Presentation, WSU, March 30, 2007.
3. *Site switching of  $^{111}In$  impurities in  $Al_2Gd$* , Ashley Dorwart and Gary S. Collins, REU Summer School "Extreme Matter" poster exposition, Murrow Communications Center, WSU, August 2, 2007.
4. *Site preferences of  $^{111}In$  solutes in  $L1_2$  rare-earth stannide and plumbide mirror phases*, Benjamin Norman, Honors College Thesis Oral Defense, October 3, 2007.
5. *Impurity diffusion in  $L1_2$  intermetallic compounds*, Xia (Sean) Jiang and Gary S. Collins, Wiley Research Exposition, Graduate and Professional Student Association, WSU, February 13, 2008 (poster). This poster by Xia won third-place prize of \$200 for best poster in the category of Engineering and Physical Sciences.
6. *Diffusion of  $^{111}Cd$  probes in  $Ga_7Pt_3$  studied by nuclear quadrupole relaxation*, Farida Selim, John P. Bevington and Gary S. Collins, Academic Showcase, WSU, March 28, 2008 (poster).
7. *Impurity diffusion in  $L1_2$  intermetallic compounds*, Xia (Sean) Jiang and Gary S. Collins, Academic Showcase, WSU, March 28, 2008 (poster).
8. *Site preferences of solute atoms in mirror phases* (approximate title), Benjamin Norman and Gary S. Collins, Academic Showcase, WSU, March 28, 2008 (poster).



9. *Site preferences of solute atoms in mirror phases* (approximate title), Benjamin Norman and Gary S. Collins, College of Sciences Undergraduate Poster Competition, WSU, April 4, 2008 (poster).
10. *Jump frequencies of Cd tracer atoms in  $L1_2$  lanthanide stannides*, Megan Lockwood and Gary S. Collins, Poster Exposition for REU Summer Schools in Physics and Engineering at WSU, CUE Atrium, August 5-6, 2008.
11. *Jump frequencies of Cd tracer atoms in  $L1_2$  lanthanide stannides*, Megan Lockwood and Gary S. Collins, oral talk, APS Joint Meeting of the Texas and Four Corners Sections, El Paso, October 17-18, 2008. [http://absimage.aps.org/image/MWS\\_TS4CF08-2008-000082.pdf](http://absimage.aps.org/image/MWS_TS4CF08-2008-000082.pdf)
12. *Jump frequencies of Cd probe atoms in  $In_3(La_{1-x}Pr_x)$  pseudo-binary compounds*, Randal Newhouse and Gary S. Collins, Academic Showcase, WSU, March 27, 2009. (poster paper).
13. *Calculation of formation energies of intrinsic point defects in  $In_3La$* , John P. Bevington and Gary S. Collins, Academic Showcase, WSU, March 27, 2009. (poster paper).
15. *Jump frequencies of tracer atoms on Al-sites in  $Al_4Ba$  phases*, Randal Newhouse and Gary S. Collins, 11<sup>th</sup> Annual Meeting of the Northwest Section of the American Physical Society, Vancouver, BC, May 14-16, 2009. <http://meetings.aps.org/Meeting/NWS09/Event/106772>
16. *Calculation of formation energies of intrinsic point defects in  $In_3La$* , John P. Bevington and Gary S. Collins, 11<sup>th</sup> Annual Meeting of the Northwest Section of the American Physical Society, Vancouver, BC, May 14-16, 2009. <http://meetings.aps.org/Meeting/NWS09/Event/106773>
17. *Diffusion in  $Al_4Sr$  and  $Ga_4Sr$  studied using PAC spectroscopy*, Samantha Cawthorne and Gary S. Collins, Research Experience for Undergraduates (REU) public poster exposition, CUE Building, WSU, July 31, 2009.
18. *Explaining the change in diffusion mechanism in the series of  $L1_2$  phases  $In_3R$  ( $R$ = rare-earth)*, John P. Bevington, Matthew O. Zacate and Gary S. Collins, Symposium on Computational Thermodynamics and Kinetics, TMS annual meeting, February 14-18, 2010, Seattle. Oral presentation. <http://www.programmaster.org/PM/PM.nsf/ApprovedAbstracts/4ACF0A2881B9C23B85257603006CDD22?OpenDocument>
19. *Diffusion on Al-type sites in intermetallic compounds having the tetragonal  $Al_4Ba$  structure*, Gary S. Collins, Randal Newhouse and Samantha Cawthorne, Symposium on Computational Thermodynamics and Kinetics, TMS annual meeting, February 14-18, 2010, Seattle. Poster presentation. <http://www.programmaster.org/PM/PM.nsf/ApprovedAbstracts/1FC4AC845FF654A5852576030069BFFF?OpenDocument>
20. *Equilibria among  $R_nCoIn_{2+3n}$  phases ( $R= La, Ce, Dy$ ) having  $Ho_nCoGa_{2+3n}$  structures*, Randal Newhouse and Gary S. Collins, Hume-Rothery Symposium: Configurational Thermodynamics of Materials, TMS annual meeting, February 14-18, 2010, Seattle. Oral presentation. <http://www.programmaster.org/PM/PM.nsf/ApprovedAbstracts/C35C35DE829C598385257603006DF019?OpenDocument>
21. *Diffusion of Al-sublattices in phases having the tetragonal  $Al_4Ba$  structure*, Randal Newhouse, Samantha Cawthorne and Gary S. Collins, Academic Showcase, WSU, March 27, 2010 (poster).
22. *Understanding a change in diffusion mechanism in rare earth indides*, John P. Bevington and Gary S. Collins, Academic Showcase, WSU, March 27, 2010 (poster).
23. *Atomic jump frequencies of probe atoms in tin compounds*, Xiangyu Yin, Randal Newhouse and Gary S. Collins, Academic Showcase, WSU, March 27, 2010 (poster).
24. *Nuclear relaxation in  $In_3Rh$ ,  $In_3Ru$  and  $In_3Ir$  compounds caused by diffusion of indium*, Prastuti Singh, Randal Newhouse and Gary S. Collins, Undergraduate research poster competition, WSU, March 30, 2010 (poster).
25. *Dependence of diffusion on composition in pseudo-binary  $La(In_{1-x}Sn_x)_3$  phases*, Justine Minish, Randal Newhouse and Gary S. Collins, Research Experience for Undergraduates (REU) public poster exposition, CUE Building, WSU, August 6, 2010.

26. [Atomic ordering in ternary phases having the Al<sub>4</sub>Ba structure](#), [Lee Aspitarte](#), Xiangyu Yin, Randal Newhouse, Gary S. Collins, NWS10 Meeting of the American Physical Society, Walla Walla, Washington, October 2, 2010. Contributed talk abstract C3.00004..
27. [Application of Polypacfit to obtain jump frequencies of probe atoms having collinear EFG axes in Al<sub>4</sub>Ba phases](#), [Randal Newhouse](#), Matthew Zacate, Gary S. Collins, NWS10 Meeting of the American Physical Society, Walla Walla, Washington, October 2, 2010. Contributed talk abstract C3.00005.
28. [Solubility of indium probe atoms in supercooled gallium liquid metal between 8K and 300K](#), [Xiangyu Yin](#), Randal Newhouse, John Bevington, Gary Collins, NWS10 Meeting of the American Physical Society, Walla Walla, Washington, October 2, 2010. Contributed talk abstract H3.00003.
29. *Solubility of indium probe atoms in supercooled gallium liquid metal between 10K and 300K*, [Xiangyu Yin](#), 2010 William R. Wiley Research Exposition: Engineering and Physical Sciences, November 8, 2010, oral presentation.
30. *Solubility of indium in solid gallium*, [Xiangyu Yin](#), Randal Newhouse and Gary S. Collins, Academic Showcase, March 25, 2011 (poster).
31. *Modeling atomic jump frequencies in pseudo-binary alloys*, [Randal Newhouse](#) and Gary S. Collins, Academic Showcase, March 25, 2011 (poster).
32. *Polymorphic and peritectic phase transformations of In<sub>3</sub>Zr studied by PAC*, [Lee Aspitarte](#) and Gary S. Collins, Academic Showcase, March 25, 2011 (poster).
33. *Diffusion in La<sub>n</sub>CoIn<sub>3n+2</sub> phases studied by perturbed angular correlation*, Eighth International Conference on Diffusion in Materials (DIMAT2011), Dijon, France, July 2011. [Randal Newhouse](#) and Gary S. Collins. Oral presentation. <http://www.dimat2011.com/>
34. *Corrected phase diagram for In-Ni near 30 at.% Ni*, [Lee Aspitarte](#) and Gary S. Collins, Research Experience for Undergraduates (REU) public poster exposition, CUE Building, WSU, August 5, 2011.
35. *Temperature dependence of the hyperfine field in nickel metal*, [Jesse Miller](#) and Gary S. Collins, Academic Showcase, March 30, 2012 (poster).
36. *Site preferences of indium solutes in REPd<sub>3</sub> and REAL<sub>2</sub> phases*, [Qiaoming Wang](#) and Gary S. Collins, Academic Showcase, March 30, 2012 (poster).
37. *Interactions between solute atoms in solids*, [Ryan Murray](#) and Gary S. Collins, 2015 UO/WSU Optical Society of America Meetup, WSU, September 12, 2015.
38. *Interactions between pairs of solute atoms in the intermetallic GdAl<sub>2</sub>*, [Debashis Banerjee](#), [Ryan Murray](#) and Gary S. Collins, Academic Showcase, WSU, March 25, 2016.
39. *Reversible trapping of solute atoms at grain boundaries in the intermetallic GdNi<sub>2</sub>*, [Ryan Murray](#), [Debashis Banerjee](#) and Gary S. Collins, Academic Showcase, WSU, March 25, 2016.
40. *Predicting site preferences of impurity atoms in intermetallic compounds using the Miedema model*, [Andrew J. Bleasdale](#) and Gary S. Collins, SURCA Poster Exposition, WSU, March 28, 2016.
41. *Trapping of solute atoms at grain boundaries in GdNi<sub>2</sub>*, [Ryan Murray](#), [Debashis Banerjee](#) and Gary S. Collins, International Conference on Hyperfine Interactions and their Applications, Leuven, July 3-8, 2016. <http://www.hyperfine2016.be/>. Slides of the [PechaKucha](#) presentation to an audience of 100 are at [https://iks32.fys.kuleuven.be/files/hyperfine2016\\_slides/38\\_PechaKucha-2.3\\_Murray.pdf](https://iks32.fys.kuleuven.be/files/hyperfine2016_slides/38_PechaKucha-2.3_Murray.pdf). Video starting at 08:25 is at <https://videolab.avnet.kuleuven.be/video/?id=aa5905fa9b314277009b4a4b69bad29e>.
42. *Predicting an impurity atom's site preference in an intermetallic compound using Miedema's method*, [Andrew Bleasdale](#) and Gary S. Collins, Showcase for Undergraduate Research and Creative Activities (SURCA), WSU, March 27, 2017.
43. *Interactions between indium solute atoms in intermetallic GdAl<sub>2</sub>*, [Ryan Murray](#) and Gary S. Collins, Academic Showcase, Graduate Student Research Exposition, March 30, 2017.

44. *Solid solution strengthening of NiAl with small atomic % of solutes*, Gabrielle Schuler and Gary S. Collins Physics Department Poster Exposition for Undergraduates, Honors Hall, WSU, November 29, 2018.

### COMPETITIVE AWARDS WON BY STUDENTS (since 2006)

1. College of Sciences Research Minigrant, Stephanie Lage, May 2006, for her proposal: *Unique lattice locations in Cr<sub>3</sub>Si*. \$2500 stipend.
2. College of Sciences Research Minigrant, Benjamin Norman, May 2007, for his proposal: *Lattice locations of solute atoms in mirror phases*. \$2500 stipend.
3. Wiley Research Exposition, Graduate and Professional Student Association, Best poster in the category of Engineering and Physical Sciences, Xia (Sean) Jiang, Physics, WSU, February 13, 2008, *Impurity diffusion in LI<sub>2</sub> intermetallic compounds*, and Gary S. Collins. This poster also won Xia a third-place prize in all categories of \$200.
4. INTEL Science Talent Search Semifinalist, Prastuti Singh, Pullman High School, announced January 13, 2010: *Nuclear relaxation in CoGa<sub>3</sub> lattice structure*. This nationally competitive award was accompanied by stipends of \$1000 for Prastuti and \$1000 for Pullman High School. The list of semifinalists can be found at <http://www.societyforscience.org/Document.Doc?id=128>. A news article and interview can be found at <http://www.wsu.edu/~collins/Prastuti-dnews-100125.pdf>.
5. College of Sciences Research Minigrant, Kenneth Dorrance, May 2010, for his proposal: *Atom movement in La<sub>2</sub>Co<sub>2</sub>In<sub>10</sub> and related phases*. \$2500 stipend.
6. GPSA travel grant to attend Dijon diffusion conference, July 2011, Randy Newhouse, \$650.
7. College of Sciences, Undergraduate Student Research Minigrant, Benjamin McDonald, May 2012, for his proposal: *Understanding properties of impurity atoms in intermetallic compounds*. \$3000 stipend.
8. College of Arts and Sciences, Undergraduate Student Research Minigrant, Andrew Bleasdale, April 2014, for his proposal: *Predicting lattice locations of impurity atoms in crystalline compounds*. \$3000 stipend.
9. NASA Space Grant Scholarship, Krystal Kasal, Spring 2015, \$2000.
10. Invitation to attend workshop on Radioactive Ion Beams, Ryan Murray, Florida, August 2015.
11. Invitation and funding to attend International Conference on Condensed Matter Nuclear Science (ICCF, cold-fusion), Windy Olsen, June 3-8, 2018.

### STUDENT DISSERTATIONS, THESES AND TECHNICAL REPORTS (since 2010)

*Nuclear relaxation in CoGa<sub>3</sub> lattice structures*, Prastuti Singh, report submitted to the competitive high-school *Intel Science Talent Search* 2010, winning an award for her as semifinalist, 17 pages. <http://hdl.handle.net/2376/4191> Technical report 6 of grant NSF DMR 09-04096.

*Lattice locations and diffusion in intermetallic compounds explored through PAC measurements and DFT calculations*, PhD dissertation, John Paul Bevington, May 2011, 107 pages. <http://hdl.handle.net/2376/4189> Technical report 1 of grant NSF DMR 09-04096.

*Indium solubility in  $\alpha$ -gallium and gallium-indium eutectic alloys studied using PAC*, MS thesis, Xiangyu Yin, May 2011, 51 pages. <http://hdl.handle.net/2376/4188> Technical report 2 of grant NSF DMR 09-04096.

*Site preferences and jump frequencies of In/Cd solutes in rare earth palladium phases having the LI<sub>2</sub> structure*, MS thesis, Qiaoming Wang, May 2012, 76 pages. <http://hdl.handle.net/2376/4187> Technical report 3 of grant NSF DMR 09-04096.

*Atomic jump frequencies in intermetallic compounds studied using perturbing angular correlation of gamma rays*, PhD dissertation, Randal Gordon Newhouse, August 2012, 126 pages. <http://hdl.handle.net/2376/4186> Technical report 4 of grant NSF DMR 09-04096.

*Geometry of Wigner-Seitz Cells in Intermetallic Compounds and Application to Site Preferences of Indium Impurity Atoms*, Benjamin G. McDonald, undergraduate research report, October 2012, 85 pages. <http://hdl.handle.net/2376/4192> Technical report 5 of grant NSF DMR 09-04096.

*Investigations of ternary alloys using perturbed angular correlations*, Krystal Kasal, MS research report, June 2015, 29 pages. Technical report 1 of grant NSF DMR 14-10159. <https://research.wsulibs.wsu.edu:8443/xmlui/handle/2376/5288>

*A qualitative look at the thermodynamics of ternary phase diagrams*, Elyse Waham (undergraduate senior thesis, May 2016). Technical Report 2 of grant NSF DMR 14-10159). <http://hdl.handle.net/2376/6258>

*Solute-solute interactions in intermetallic compounds studied using perturbed angular correlation of gamma rays*, PhD dissertation, Ryan Murray, May 2017, 187 pages, Technical Report 3 of grant NSF DMR 14-10159. <http://hdl.handle.net/2376/12219>.

*Extending Miedema's semi-empirical model to predict defect site preferences and formation enthalpies in intermetallic compounds*, Andrew Bleasdale (undergraduate senior thesis, December 2016). Technical Report 4 of grant NSF DMR 14-10159. <http://hdl.handle.net/2376/12221>